AVIATION WEEK

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Grumman

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The GRUMMAN PANTHER is the latest of a long line of Navy Fighters. Like such famous predecessors as the WILDCAT and HELLCAT this fast, rugged turbo-jet was "ready when needed." Since the start of the Korean War it has distinguished itself in combat with Navy and Marine pilots at the controls.

In addition to fighters, Grumman meets our national needs with torpedo-bombers, anti-submarine planes and versatile amphibians.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE

Contractors to the Armed Forces

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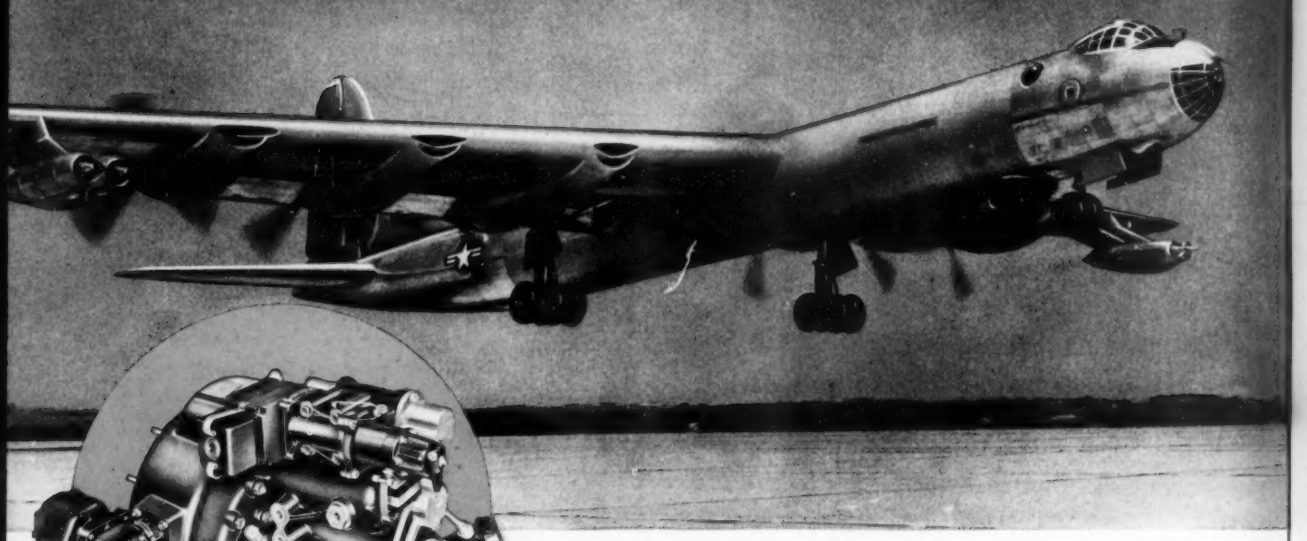
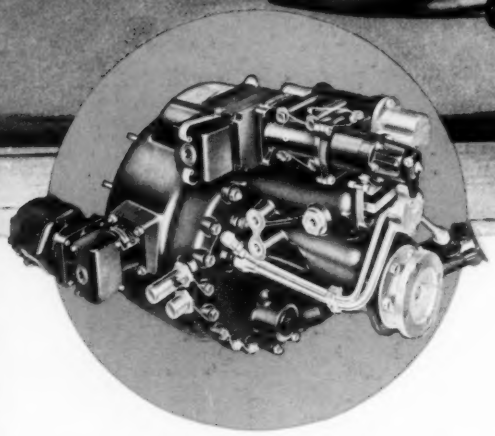
Sundstrand Constant Speed Alternator Drives on B-36's log more than 6500 TROUBLE-FREE HOURS





Service records verify reliability of this precision-built transmission

Studies of service records at Travis, Rapid City, and Carswell Air Force bases reveal that Sundstrand's alternator drive for the B-36 has acquired an enviable reputation for dependable performance. At Travis, for example, there was only one minor accessory adjustment reported in more than 6500 constant speed drive hours logged on B-36's at this base. Similar records are being set at other fields. This remarkably efficient drive—which makes possible greater use of AC power—has so proved itself that aircraft and engine designers are now incorporating it in other types of bombers, transports, fighters and engines. Special adaptations can be developed for you through Sundstrand's *reliable* research, *expert* engineering, and *precision* production.

SUNDSTRAND

SUNDSTRAND HYDRAULICS

SUNDSTRAND MACHINE TOOL CO.
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AIRCRAFT AND INDUSTRIAL HYDRAULIC TRANSMISSIONS, PUMPS, MOTORS, AND VALVES • OIL BURNER PUMPS • AIR SANDERS
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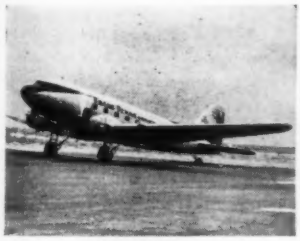
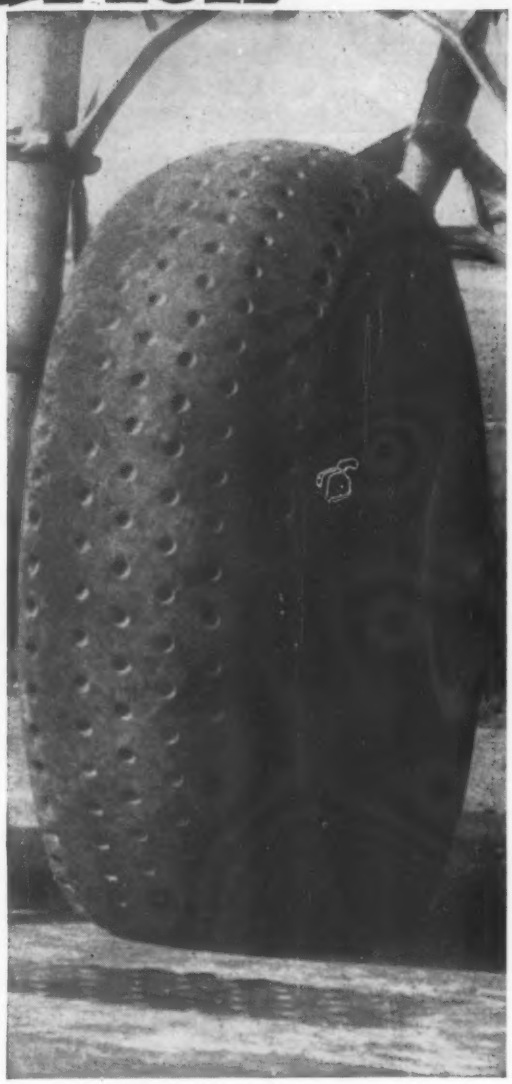


Trans-Texas

West Coast



In tests by 8 airlines, new dimpled tire outwears all others

EIGHT AIRLINES who have used a new B. F. Goodrich tire in actual service have now reported it outwears all other tires they have used.

It has a new kind of tread design with round, dimple-like indentations in the rubber. The dimple indentations provide better distribution of the tire load and reduce exposure to tread cutting. The tread design is a complete departure from conventional ribbed treads.

A typical report from an airline which tested the new tire on DC-3 equipment: "We removed the tires after 400 hours, 1200 landings. In the process of recapping, we discovered that there was enough rubber left for about 100 hours more, a total of 1500 landings. These tires have given us longer service than any we have used."

The new tires have now been adopted by all eight airlines shown above.

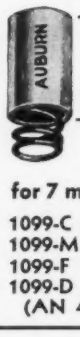
Production of the new tire in seven sizes is now underway at B. F. Goodrich. The new, longer wearing B. F. Goodrich tire is the latest "first" in aviation tires from B. F. Goodrich, leader in rubber research and engineering. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

Auburn SPARK PLUG CONNECTORS

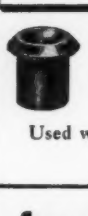
for aircraft



for 7 mm cable
1041-C Steatite
1041-M Mycalex
1041-D Alumina
(AN 4164-2)

for 7 mm cable
1099-C Steatite
1099-M Mycalex
1099-F Phenolic
1099-D Alumina
(AN 4164-1)

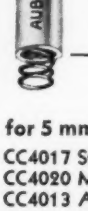
9/16" and 1" sleeves only, without springs, are also available



TERMINAL COLLARS
1042 Neoprene
1043 Silicone

Used with all ⅝" connectors on 7 mm cable

for military trucks and tanks



for 5 mm cable
SP420 Steatite
CC4025 Mycalex
CC4006 Alumina

for 5 mm cable
CC4017 Steatite
CC4020 Mycalex
CC4013 Alumina

9/16" and 11/16" sleeves only, without springs, are also available

Neoprene or Silicone Grommets
AD51-960
Used with all 11/16" connectors on 5 mm cable

AD50-894
Used with all 9/16" connectors on 5 mm cable

AA50-313
Spring Assembly

Used with all 9/16" and 11/16" connectors for 5 mm cable

AUBURN SPARK PLUG Co. Inc., Auburn, N.Y.

Aviation Week

ABP Member ABC

Volume 55 — December 31, 1951 — Number 27

Headline News

NATO to Get Little Air Aid from U.K. 12
Air Armament Trend Is to Cannon.. 14
Aircraft Sales 15
Production Czar 16

Financial

Local Service Lines Come of Age..... 18

Production Engineering

Bristol Freighter, Blackburn & GAL-60 21
Westinghouse Plans Expansion..... 23
Thompson Expands 24
291 Small Jobs..... 24
Research Wanted on Plastics..... 27
Air Research Hits Peak at Cornell... 29

Production

Remington Keeps a Hot Plane Cool.. 32

Equipment

How TWA Beat Flood Disaster..... 35
New Method Doubles Pump Life..... 39

Air Transport

Rush to Coaches Opens New Era..... 44
Cut Travel Red Tape, ICAO Says..... 45
Tories Plan Private Share in Civil Air 46
ONA Withdraws Coach Bid..... 46
Court Grants Nonsked a Stay..... 48
Anti-Skid Braking Device Used..... 50

Editorial

Lot Safer on Trains..... 58

Departments

News Digest 7
Aviation Calendar 8
Washington Roundup 9
Who's Where 11
Industry Observer 11
NACA Reports 31
AF Awards 32
Production Briefing 33
Shortlines 56
What's New 56

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Production Ingenuity Marks Nation's Largest Airframe Sub-Contractor

Seeking a better, faster way to do a job has been TEMCO's policy since its beginning back in 1945, and this policy has been mainly responsible for the company's rapid growth to its position now as one of the largest, if not the largest, airframe sub-contractors in the country.

Characteristic of this philosophy are the innovations recently made by TEMCO in its BOEING sub-contract for B-47 rear fuselage sections. On the B-47 installation line, separate fixtures for the individual sections have been abolished, and sections travel from position to position on an elevated track supported by wheels bolted directly to the shipping rings at either end of the section. Other time and labor-saving additions to the B-47 installation line include permanent housings on the floor under each position with air and electric outlets at five foot intervals to eliminate need for long hoses and cables or overhead drops; suspended work platforms which travel with the units and provide proper work levels for each operation; and canvas protective covers for the top access doors.

The "rolling" production line has resulted in added production efficiency, greater safety and better housekeeping practice. These three are objectives that TEMCO ranks high and that have played an important part in TEMCO's amazing growth.

TEMCO Elects Two New Vice-Presidents

The election of two new vice-presidents has recently been announced by TEMCO President, Robert McCulloch. The new officers are John A. Maxwell, Jr., and Clyde Williams, both members of the original group who started with TEMCO when the company was founded in 1945.

John A. Maxwell, Jr.

Clyde Williams

Maxwell, a native of Lancaster, Penn., attended Princeton University and held numerous industrial positions with Follmer Clogg & Co., Inc.; DeWalt Products Corp.; and North American Aviation, Inc., before joining TEMCO. Prior to being named vice president in charge of manufacturing, Maxwell was works manager for the company.

Williams, who has been appointed vice president comptroller, is a native of Mineola, Texas, and a graduate of Baylor University. Before coming with TEMCO in 1945 as chief accountant, Williams had worked for Dallas Power and Light Co., the accounting firm of Ernst and Ernst, an automobile dealership in Dallas, and the Texas Division of North American Aviation, Inc.

TEMCO *is rolling!*

Elevated Track for B-47 Sections Typical of TEMCO Production Ingenuity

A major reason for TEMCO's rapid rise to its position as one of the largest airframe sub-contractors in the country is the production ingenuity constantly displayed throughout its operations. Typical of this manufacturing ambidexterity are the innovations effected by TEMCO on its B-47 rear fuselage installation line.

Separate fixtures for the individual sections have been eliminated, and sections now travel from position to position on an elevated track supported by wheels bolted directly to the shipping rings at either end of the section. To further speed this work, suspended work platforms which travel with the units and provide proper work levels at all times have been installed.

Experience has proved the advantage of these innovations in better parts flow and added production efficiency. It's another characteristic of the TEMCO way . . . the way to greater production with greater efficiency at less cost. As well as the B-47 job for BOEING, TEMCO also is "rolling" on major sub-contracts for MARTIN on the P5M-1 Marlin . . . for DOUGLAS on the A2D Skyshark . . . and for LOCKHEED on the P2V Neptune.

TEMCO
TEXAS ENGINEERING AND MANUFACTURING CO. INC
DALLAS, TEXAS

Texas Engineering and Manufacturing Co., Inc.

DALLAS, TEXAS

FOREMOST IN SCIENTIFIC DEVELOPMENT

IN THE REALM OF FORGING DESIGN AND THE DEVELOPMENT OF PROPER GRAIN-FLOW, WYMAN-GORDON HAS ORIGINATED MANY FORGING DESIGNS WHICH AT THE TIME OF THEIR DEVELOPMENT WERE CONSIDERED IMPOSSIBLE TO PRODUCE BY FORGING.

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ESTABLISHED 1883

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN

NEWS DIGEST

DOMESTIC

Paul Henderson, 67, airmail service pioneer, died Dec. 18 after a prolonged illness. An aviation enthusiast since the early 1920s, he was Second Assistant Postmaster General, mail transportation, 1922-1925. He also helped to organize National Air Transport, Transcontinental Air Transport and became vice president and director of United Aircraft and Transport in 1931.

Delta Airlines distributed $90,000 in defense bonds as a Christmas bonus to its 2,540 employes in 33 cities. Employes with more than six months service received a $50 bond, those with less than six months received a $25 bond.

NWA's passenger load factors in November showed a nearly 30pc increase for the second straight month. November's load factor was 62.87%. Revenue miles were 1,569,529, revenue passenger miles, 48,076,166. Freight ton miles were 1,030,938, express ton miles 153,973, mail revenue ton miles, 389,072.

English Electric Canberra, one of two the Glenn L. Martin Co. was testing, crashed in Maryland after losing its tail. One member of the crew parachuted to safety, the other was killed. Martin has contracts to build a modified Canberra, the B-57A, for USAF.

Donald W. Nyrop and Oswald Ryan were reappointed by President Truman as chairman and vice chairman, respectively, of CAB for 1952.

Mrs. Greenwood Overstreet Cocanougher, winner of the Powder Puff Derby in 1950, died in Lexington, Ky., hospital Dec. 21. She had instructed Army and Navy pilots in World War II.

INTERNATIONAL

North American F-86E being built by Canadair under license for the RCAF has been named the Star. USAF calls plane the Sabre.

Silver City Airways, British cargo and passenger line, has ordered six "long-nosed" 170 Freighters from Bristol Aeroplane Co. New planes are said capable of carrying three small cars instead of two, and 20 passengers instead of 12. Silver City operates eight Freighters now.

Air France was struck at midnight, Dec. 19, by flight crews asking higher wages. About 1,200 employes were out.

International glider meet is planned for Madrid next spring. Entries from Germany, Switzerland, Italy and Sweden have been received. England, France, Argentina, Venezuela and the U. S. have announced their intention to compete.

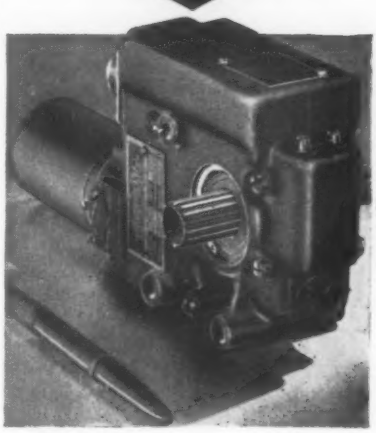
El Misr four-engine Languedoc crashed in Iran Dec. 22, killing all 21 persons aboard.

HELICOPTER INDUSTRY AWARDED COLLIER TROPHY

Smiles were the order of the day when President Truman presented the coveted Collier Trophy to Igor Sikorsky in honor of helicopter industry and the military services' development and use of rotary-wing craft for rescue work (Aviation Week Dec. 17, p. 18). Left to right, witnessing the ceremony at the White House, are: Secretary of Defense Robert Lovett, Mr. Truman, Sikorsky, Joseph T. Geuting, Jr., acting president of the National Aeronautic Assn. and Vice Adm. Merlin O'Neill, Coast Guard.

ROTORAC

high torque rotary actuator with load-sensitive switches



The limit switches of the R-450 Rotorac can be set for any torque value up to 300 pound inches. With positive internal stops, travels up to 270 degrees may be obtained. Without them, the Rotorac can be used for multiple revolution travel.

The R-450 Rotorac has a double-ended splined output shaft. It will operate doors, valves or any other equipment requiring rotary actuators.

At a load of 250 pound inches, speed is 5 rpm, and the current consumption 3.5 amperes at 26 volts D.C.

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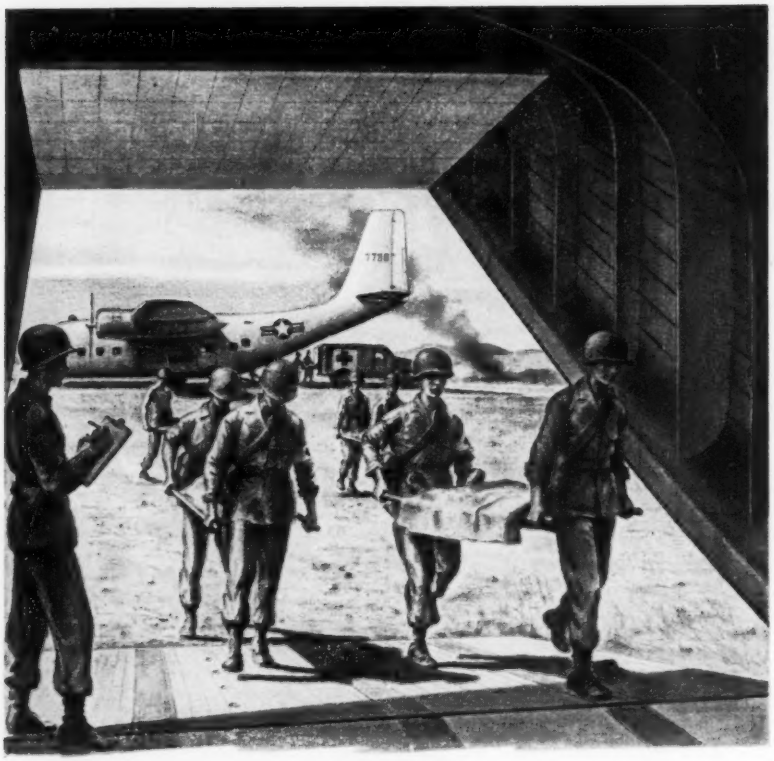


Airvac... from anywhere

Chase Assault Transports demonstrated at Exercise "Southern Pine" functions which *they alone* are able to perform: delivery of heavy equipment into forward combat areas *by landing*; immediate evacuation of casualties from front lines.

Men suffering injuries at "Southern Pine" were evacuated to base hospitel right from the jump zone – quickly, efficiently, safely.

APPROVED AND ACCEPTED BY U.S.A.F.

Chase AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY

STROUKOFF AVITRUC

AVIATION CALENDAR

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Pilots Assn., Opa Locka Airport, Florida.

Jan. 6-8—Annual Cessna Distributors Meeting, Allis Hotel, Wichita, Kansas.

Jan. 8-10—Upper Midwest Armed Forces Procurement Exhibit showing small businessmen subcontracting possibilities, National Guard Armory, Minneapolis.

Jan. 14-18—Annual meeting of Society of Automotive Engineers; included among the papers will be several on aircraft and aviation; Hotel Book-Cadillac, Detroit.

Jan. 22—Meeting of Institute of the Aeronautical Sciences, Cleveland-Akron Section; talk, "Freight by Air," by T. L. Grace, president of Slick Airways; Cleveland.

Jan. 22—International Air Transport Assn. Technical Committee meeting, Madrid.

Jan. 28-Feb. 1—20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York.

Jan. 29-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

Feb. 7—Meeting of Society of Automotive Engineers, Igor I. Sikorsky will speak on helicopter programs. Brass Rail Restaurant, 5 Ave. near 43 St., New York.

Feb. 7-8—Regional meeting of Instrument Society of America, Power Plant Symposium, Hotel Statler, New York.

Mar. 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

Mar. 3-7—Spring meeting of American Society for Testing Materials; symposium on testing metal powders and metal powder products; Hotel Statler, Cleveland.

Mar. 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

Mar. 17-22—American Society of Tool Engineers, International Amphitheater, Chicago, Ill.

Mar. 21—National Flight Propulsion Meeting, Institute of the Aeronautical Sciences, Cleveland.

Mar. 30-Apr. 3—Convention of American Association of Airport Executives, Ft. Worth.

April 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

May 8-9—Fifth annual Wisconsin Aeronautics Conference, Green Bay.

June 9-21—Triennial meeting of International Organization for Standardization; host will be American Standards Assn.; Columbia University, New York.

PICTURE CREDITS

7—Wide World; 12—(top) de Havilland; (center) McGraw-Hill World News; (bottom) Derek Wood; 13—(top, center) de Havilland; (bottom) McGraw-Hill World News; 17—(Scorpions) Northrop; 20—McGraw-Hill World News; 21—David A. Anderton; 35—Acme; 45-46—Bob Blatt.

Washington Roundup

What's Ahead

• Target of productive capacity to make 50,000 planes and 18,000 jet engines a year will be reached by mid-1953—mobilization officials expect. (Actual output in 1944, peak World War II year: 96,000 planes.)
• Production will sharply climb from now to then.
• Target of a 143-wing Air Force—126 combat and 17 transport wings—and a 16-air-carrier-group Navy, in-being, is down for achievement by mid-1954.
• After 1953 production is scheduled to fall off. There will be more emphasis on "quality," less on "quantity"—according to Defense Mobilizer Charles Wilson.
• The planning headache: What to do with surplus plant capacity then?

If it's switched to civilian production, it won't be readily available for war output. In mothballs, it'll become obsolete for production of latest plane types.

What's Past

President Truman, a year ago: "Within one year, we will be turning out planes at five times the present rate of production."

Aircraft production rate, December, 1950: 250 planes a month.

Aircraft production rate, December, 1951: 450 planes a month.

Partial Financing

If the allocation for aircraft procurement in the President's 1953 fiscal year budget, which goes up to Congress in January, falls below the $15 billion approved for this year, the industry shouldn't be perturbed.

Likelihood is that the Administration, to keep the 1953 budget for defense at $50 billion or thereabouts, will go all out for "partial financing."

Under this plan, USAF and Navy would get only a portion of the funds—to make down payments to contractors—they would actually commit during the year for plane purchasing.

For example: In the past, if USAF were going to make contracts for $10 billion in planes, $10 billion would be requested in its budget. But, under the "partial financing" scheme, USAF would contract for $10 billion in planes, but would get only $3 billion or $5 billion in its budget to make progress payments to contractors and "partially finance" the program.

From the Administration's point of view, the advantage is: It permits the big military build-up, which is the cornerstone of its political and foreign policy, but makes the pill less bitter by putting off payment. And "partial financing" has the blessing of Congress, too.

More Contracts Coming

Contract letting for planes, parts, electronics and other related procurement probably will step up over the next six months.

At mid-point in the 1952 fiscal year:
• Air Force has made contracts for only 37%—$4.1 billion—of the $11.2 billion it has for procurement for the year. It has committed, with letters of intent, 60% of the amount—$6.7 billion. This leaves 40%—$4.5 billion—to commit over the coming six months.
• BuAer has made contracts for 45%—$1.7 billion—of the $3.8 billion it has for procurement. Committed: 65%—$2.5 billion. This leaves 35%—$1.3 billion—to commit between now and July.

It's a question, though, as to how procurement will progress at Wright-Patterson AFB.

Morale among procurement officers and key civilians is low and contracting is falling far behind schedule. Large majority of them have operated strictly aboveboard and many would prefer to be in other jobs. They are irritated and rankled by criticism of the procurement staff because of isolated cases of irregularities at the base, now under investigation by Sen. Lyndon Johnson's Preparedness Committee.

Navy Build-Up

Navy is growing increasingly irritated at being shortchanged in the defense build-up program.

Navy claims that the modest build-up so far approved of a 14-air-carrier-group striking force—which it had back in 1949 before the "economy" move—requires procurement of 4,900 aircraft this year.

But, Navy men complain, the Administration has allowed money for only 3,700. And the $333 million additional voted by Congress only reduces by about 370 aircraft the 1,200-plane gap between what the Navy thinks it ought to have and what it has.

Other Naval Developments

• **New carrier?** Navy wants to start construction on another new carrier next mid-year—but the Administration is likely to veto the project. The Forrestal will be afloat late in 1954, to be manned with A-bomb-carrying planes with a radius of action of 1,700 miles, or more.
• **Rocket copter.** Navy expects to flight test its one-man flying belt copter in two months. At best, Navymen say, it'll be an expensive military weapon: Takeoffs on the Rato principle will cost at least $100, probably more.

Here and There

Paul Aiken, formerly assistant Postmaster General, now a Washington attorney, is advising Pan American World Airways on mail matters. Ex-Defense Secretary Louis Johnson's law firm, Steptoe and Johnson, remains PAA's regular Washington legal representative.

Two current PAA worries:
• That rates will be juggled at the coming Universal Postal Union meeting in May to the advantage of some European carriers and the disadvantage of trans-Atlantic.
• That a step-up of services by European countries will leave PAA with a smaller slice of mail and other international traffic. Swissair, which recently ordered six DC-6s, plans an increase in service and the word overseas is that Aer Lingus, Irish line, will soon inaugurate trans-Atlantic service.

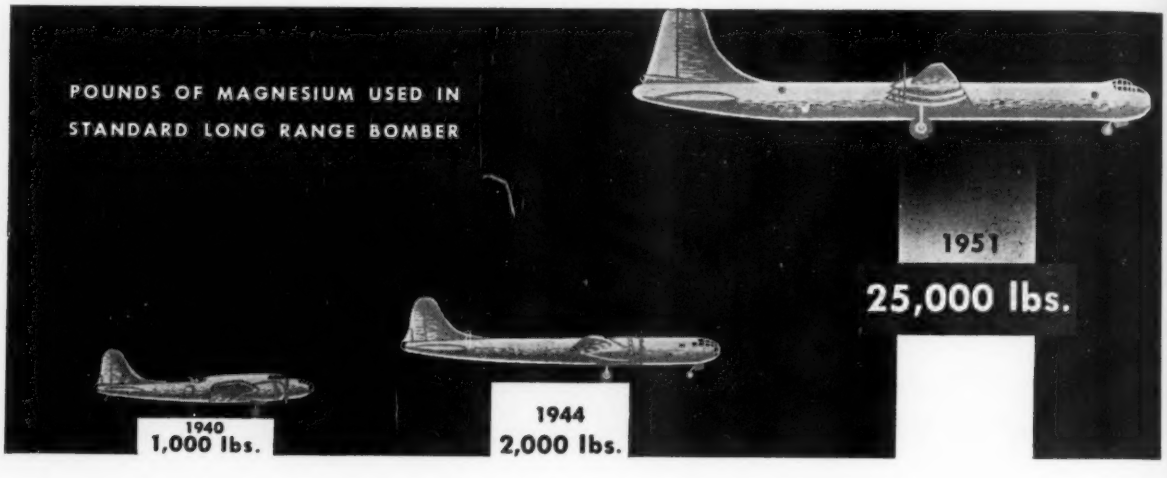
Ace Performer? Although aircraft production generally is lagging, Henry Kaiser reports to the press corps that he's "far ahead" in plane and engine production under direct and subcontracting.

Senate Preparedness Committee is looking into high costs of training at Air Force bases due to too many "trimmings," such as elaborate club houses and also USAF's safety record in pilot training.

—Katherine Johnsen

THEY FLY *Faster...Farther...Higher...*

with



MAGNESIUM

More payload! That's what modern aircraft design demands—and that's why magnesium, the world's lightest structural metal, finds ever increasing use in air transportation. One-third lighter than the next lightest structural metal, it cuts important pounds off weight, without sacrificing strength. As a result today's bomber covers greater distances, at higher altitudes and increased speeds—with more payload!

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WHO'S WHERE

Changes

W. H. Bobear has been named manager of subcontracting for General Electric Co.'s Aeronautic and Ordnance Systems departments.

P. D. Doran has been promoted to chief of commercial sales for Pratt & Whitney Aircraft. He was previously chief, airlines engineering.

Thomas B. Rhines has been promoted to assistant chief engineer for Hamilton Standard division of United Aircraft Corp., **William E. Diefenderfer** has been made chief development engineer, **Alden P. Edson** has been made chief materials engineer and **Donald G. Richards** is chief, vibration and mechanical metallurgy. **Stanley G. Best** has been designated consulting project engineer, **Arthur N. Allen** is now design project engineer, **Thomas P. Farkas** has been named project engineer in charge of electronic control development and **Edward W. Radtke** is now design engineer.

Air Commodore W. Wynter-Morgan has joined Sir W. G. Armstrong Whitworth Co., Ltd. He is considered one of Britain's top air armament authorities.

Van A. Bunting has been appointed contracts manager of Youngstown, Ohio, division of Swedlow Plastics Co., Los Angeles, makers of aircraft and industrial components.

Retiring

William E. (Ed) Kline, administrator of the Ninth Region, CAA, is retiring today, Dec. 31. He served with the Air Service in World War I 1917-1920, then joined the Air Mail Service, transferred to the Department of Commerce in 1927. Most of his work has been in connection with development of the Federal Airways system. In 1923 he purchased two carloads of kerosene lanterns to light the emergency fields between Chicago and Cheyenne so that night flying could be inaugurated. Kline was born Aug. 10, 1892 in Harrisburg, Pa.

Honors and Elections

John B. Clark, Northrop Aircraft's industrial relations director, has been elected chairman of the industrial relations advisory committee for the Western Region Aircraft Industries Assn. **Robert Wilkins**, Convair personnel manager, has been named vice chairman of the committee.

James W. Austin, Capital Airlines' vice president-traffic and sales, has been elected president of the Air Traffic Conference, which represents the traffic and sales divisions of the scheduled airlines.

Delos W. Rentzel, who recently retired as Undersecretary of Commerce for Transportation, has been awarded a gold medal by the Commerce Department "for exceptional service, especially in drafting a defense mobilization program for shipping, and in helping with a mobilization plan for civil aviation."

INDUSTRY OBSERVER

► First pre-production Avro CF-100 night fighter delivered to RCAF for testing in mid-October has been returned to the Avro Malton plant with a request to reduce flexing in the wing. Trouble was indicated by wrinkling at the wing root fairing, where some screws were pulled in flight tests. The difficulty is being remedied by beefing up the wing main spar with additional stiffening and is not considered serious, Canadian sources say. All of the pre-production planes, as well as production, models are being powered with Avro Orenda engines. The wing that is being remedied is a straight leading edge type and not a sweepback version, as some Canadian sources reported. A later sweepback version reportedly is under consideration for a forthcoming CF-100.

► Navy's recent Allison T-40 turboprop powerplant conference at Dayton included representatives of Convair, Douglas, North American, Bendix, Allison and Aeroproducts, besides powerplant and propeller specialists from Navy BuAer. It was called to discuss latest design changes and installation problems, along with coordination of schedules on the engine, its electronic controls and propellers for the airplanes which will use it. These include: Convair R3Y, Douglas A2D and North American A2J.

► Proposal for the seven largest U. S. airlines to chip in funds to buy one British de Havilland Comet jet transport for evaluation is being considered by a committee of the airlines. It was voted at the ATA directors meeting that the airlines do not want government subsidy for jet transport evaluation, and specifically do not want the proposed simulated airline testing operation run on a four-jet North American B-45 bomber. The U. S. airlines believe they might get one of two Ghost-engine Mark I Comets earmarked for the British Ministry of Supply.

► First Chance Vought F7U-3 Cutlass made its initial flight just before Christmas from Hensley Field, Dallas. Each of its two Allison J-35-A-29 engines has its own independent power control system, manual controls are eliminated. Larger than the F7U-1, which has completed carrier trials, the -3 is superior in climb, speed, armament and electronic equipment.

► Great Britian's Westland Sikorsky S-55 helicopter is reported flying 13 persons, with full fuel tanks. During Army maneuvers, the S-55 demonstrated it could carry 11 soldiers, six in stretchers, and a pilot and co-pilot, with gasoline tank full.

► Fuselage of first production of the 48-place turboprop-powered Vickers Armstrong Viscount 700 has been completed and four sections of the second are ready for assembly. Viscount wings are being built by Saunders-Roe Ltd. with delivery scheduled to begin shortly. First production version is scheduled to fly in early summer with delivery to British European Airways set to begin in October, 1952.

► Firestone Tire and Rubber Co. has new multi-million dollar subcontracts to build stainless steel combustion chambers, transition liner, turbine casing and exhaust cones for General Electric and Packard Motor Co., for the GE-designed J-47 jet engine. The project involves converting Firestone fabricating equipment used for making truck and tractor rims and stainless steel beverage containers.

► Greater pilot visibility in transport aircraft, which has been a matter of some CAA and airline concern for years, may come about as a result of Navy interest in the problem. Navy has obtained design studies from Douglas on a plexiglas bubble canopy arrangement for pilot and co-pilot for the R6D-1, replacing the conventional transport plane cockpit now used. Arrangement would give pilots visibility equivalent to those in fighter planes. Small twin bug-eye canopies used on some Douglas C-74 planes were discontinued when pilot and co-pilot complained that they weren't able to coordinate with each other properly. Problem seen in connection with the new canopy design is where to put all the instruments and controls which occupy the non-window space in present transport cockpits.

AVIATION WEEK VOL. 55, NO. 27 DECEMBER 31, 1951

NATO to Get Little Air Help From Britain

● Churchill pledge: We'll get on as fast as we can.

● But new plane production is still off until 1954.

By Nat McKitterick
(*McGraw-Hill World News*)

London—Admitting that Britain's £4.7 billion arms program can not be completed in three years scheduled for it, Prime Minister Winston Churchill told the House of Commons his greatest concern is the slow progress in supplying late model planes to the Royal Air Force.

Britain's whole system of supply and production is "suffering from acute indigestion," Churchill said, but added that the matter is getting active and earnest attention. He could promise only, "We shall get on as fast as we can."

▶ **Little U. S. Help**—Plain facts are that despite the unveiling of five promising new fighters and a bomber this year, Britain's contribution to the present NATO air rearmament plans will consist largely of two obsolescent fighters—the Meteor and Vampire—and the Canberra fighter-bomber.

American experts have accepted this as inevitable. None of Britain's new aircraft will be available in quantity production before late 1954—unless full wartime conditions come. Nor is U. S. aircraft production in a position to supply the needed planes.

That means that as far as present plans are concerned, NATO can rule out that Hawker P. 1067, the Vickers Supermarine Swift and the Vickers 508, the de Havilland DH 110, and the Gloster GA5, and the Vickers Valiant jet bomber as potential air armament. Production of none of these planes is even planned to begin before the end of 1952.

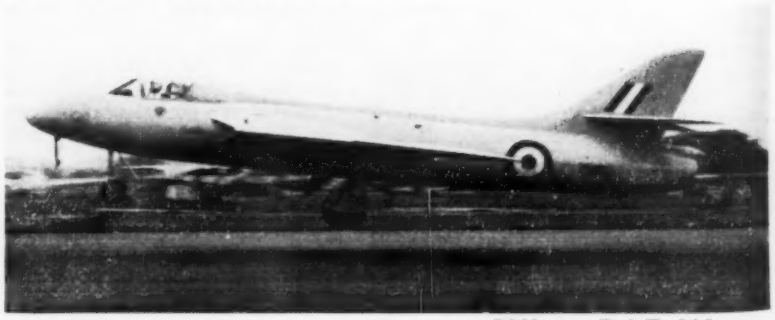
▶ **New Versions**—The prototype Swift, ordered off the drawing boards by the RAF last spring and which the Admiralty is very interested in, hasn't yet recovered from its unlucky belly-landing last August. It should be flying again in January.

The Vickers 508 twin-jet naval fighter is probably destined to be superseded by a new, swept-wing version soon.

The Vickers Valiant four-jet bomber,

THE DH 110 . . .

THE VICKERS VALIANT AND . . .

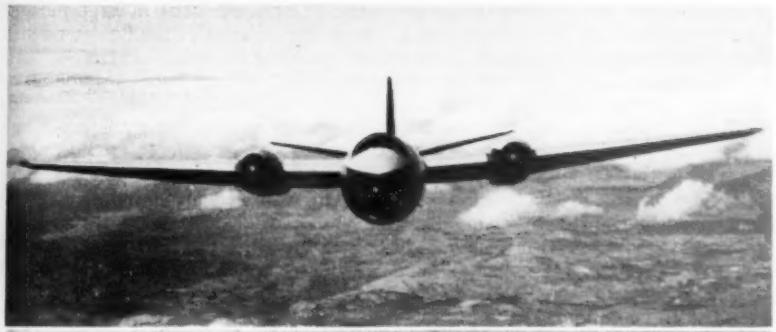


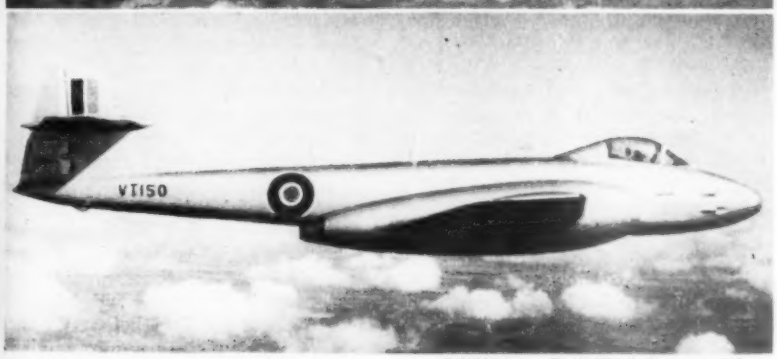
THE HAWKER P 1067 ARE . . .

What RAF Wants

THE DH VAMPIRE . . .

THE DH SEA VENOM . . .





THE GLOSTER METEOR VIII ARE . . .

What RAF Must Use

which will be built at Vickers' Weybridge Works, is still undergoing tests. Vickers Viscount turboprop transports, 20 of which have been ordered by British European Airways, are now being produced at Weybridge. The first production aircraft won't come off the line until next June. Chances are this order will be largely completed before Valiants take over.

No orders have been placed for either of Britain's new all-weather, day and night fighters—the DH 110 and the delta-wing Gloster GA5.

RAF officials want to compare performance of the two craft before making any decision.

▶ **Preliminary assessment** of the GA5 and DH 110:

• **GA5** has greater potentiality, but still a greater many operational bugs; example, GA5 has temporary delta-shaped tail plane and a fin like the Fairey delta. These are now necessary for stability, but it is hoped they can be eliminated.

• **DH 110** is much closer to production because it is easier to produce, and probably will get orders first.

▶ **Labor Trouble**—Leaving the newcomers aside, NATO officials are moderately pleased with Britain's production record. Production figures on Vampires and Meteors are secret, but you can get an idea from the fact that 200 Rolls-Royce Derwent engines for Meteors were turned out in November, which was well above recent monthly rate.

Production of the English Electric Canberra at Preston, Lancaster, has run into labor troubles. Only about 30 Canberras, or roughly one squadron, have been delivered to the RAF so far. English Electric is competing for labor directly with a company making tank engines and a Royal Ordnance Factory, both near Preston.

Production of Rolls-Royce Avons, which will expand from R-R's one present production line at Derby to at least five lines next year and probably seven eventually, is progressing satisfactorily.

Actually, Avons are piling up at Derby because of delays in Canberra production. (The Canberra is taking virtually all Avons at this time.) Production at Derby, which was about 50 a month in the early summer, is probably greater than that now.

▶ **Avon Production**—The next Avon production line will go into operation at Glasgow early next year. (There may be as many as three Avon production lines operating in the Glasgow area by the end of 1952.) D. Napier & Son Ltd., an affiliate of English Electric, will also produce Avons when its new plant at Bootle, Lancaster is completed towards the end of next year.

Bristol Aeroplane Co. Ltd. will convert some of its engine works to Avon production at Bristol next year, it is

hoped. Finally, Standard Motor Car Co. Ltd., will build Avons at Coventry.

Last summer USAF officials believed that the biggest contribution Britain could make to NATO air rearmament would be to supply Avons for an Anglo-American aircraft built around a Sabre air frame.

USAF offered 500 Sabre airframes if the British would put up the engines. The British said they couldn't get the Avon production in time, and now the issue is dead.

(Editor's Note: The British complained that a lack of fuel pumps was what made the deal impossible. Now the Americans are wondering how Rolls-Royce can afford to sell 1,000 Nenes to Canada—the Nene uses a Lucas fuel pump just like an Avon. One possible explanation: Joseph Lucas Ltd., Birmingham, is setting up a plant in Canada to turn out fuel pumps.)

▶**Quantity Possible**—Other British contributions that should arrive in time and in quantity are the de Havilland Venom night fighter, ordered by the RAF, and the de Havilland Sea Venom, ordered by the Admiralty. To date only four Venoms have been delivered. But real quantity production shouldn't be too many months away.

Of the other naval types being developed in Britain only the Vickers Attacker is being delivered in quantity. The Fairey Gannet, prospective anti-submarine specialist, is 18 months away from quantity production.

The Westland Wyvern, the Royal Navy's attack weapon, is still beset with operational bugs. The Hawker Seahawk is supposed to be delivered in quantity next year, but less than half a dozen exist now.

(Editor's Note: In any case, NATO isn't much interested in Britain's naval air contribution; they would rather have quantity production of Meteors, Vampires and Canberras quickly.)

One British plane NATO officials think could make a real contribution is the Blackburn & General GAL-60 freighter—the only British transport capable of lifting heavy military equipment. The RAF appears to be on the verge of ordering the aircraft.

Long delays have ensued, largely because the late Labor government hoped the U. S. would supply Fairchild C-119s instead. U. S. officials in London are now saying that delivery of Fairchilds will most probably be impossible. They think the GAL-60 is just what is needed to reduce the demand in NATO countries for C-119s.

Still, it seems very doubtful that the GAL-60 can be available in any quantity before 1954 .

(Editor's Note: The Bristol 171 Freighter apparently is not popular among U. S. people because it has doors in the front of the fuselage, and the opinion is that it would be of little use; couldn't jettison equipment from the air.)

▶**For the Future**—The period beyond NATO's target years of 1952-53, prospects for Britain's air contribution look brighter. The machine tool problem in the industry is getting easier. Orders from the U. S., which have been carefully "phased" over the next several months, are coming on schedule, even ahead of schedule in places.

Meanwhile, procurement of tools for the aviation industry inside Britain and on the Continent is looking up. The British have contracted for some 11,000 tools on the Continent, more than they expected to be able to get. This has allowed them to reduce orders in the States by about 1,000 tools.

The original order placed right after Korea amounted to between 7,000 and 8,000 tools, about half of which were to go to the aircraft industry.

Labor is still a very tough problem. Production at English Electric is only one of the examples. The Government has yet to take the steps necessary to get more manpower into the aircraft industry. Whether this can be done short of direction of labor by the Government is a very moot point. And politics rule direction of labor out, unless the war threat grows considerably more serious.

▶**Labor Dynamite**—There is a good chance tough businessman Oliver Lyttelton, now Colonial Secretary, will take over Defense after the turn of the year, with wide powers to direct labor, sequester materials for the defense program.

Direction of labor is political dynamite here, but there is a good chance Churchill will risk it in a mild form.

Air Armament Trend Is to Cannon

But battle of rapid-fire vs. heavier caliber still rages; look to air-to-air missiles as aircraft weapons for future.

By Ben S. Lee

Aircraft armament advocates of the cannon versus the machinegun now appear to be winning out, despite admonitions by top Air Force armament experts not to sell the very rapid firing .50cal. machinegun short.

Most new Air Force jet fighter and bomber planes are scheduled for cannon armament and all new Navy carrier types are to be so equipped. AVIATION WEEK has learned. Some USAF planes now are armed with 20mm. cannon, including F-89 and B-36.

There has been long standing disagreement the world over in military aviation circles as to whether a smaller caliber machinegun, with its rapid rate of fire, is a more effective weapon than the slower firing 20, 23, 30, 37 and 43mm. cannon.

In documentation of their advice concerning utilization of the .50cal. machinegun, top Air Force officials point to the Korean War and the losses suffered by Chinese Communist forces in air-to-air combat in comparison to U. N. losses.

▶**The Scoreboard**—In the latest official tally of the MiG 15 versus the F-86 in MiG Alley, prepared by the Defense Department, as of Dec. 8 and including all losses since start of Korean hostilities, box score shows: MiG 15s destroyed—97; probables—15; damaged—155. F-86 Sabre jets lost during the same period to enemy kills—10. Ratio: almost 10-1 in favor of the Sabres.

This would indicate that the .50cal. gun is doing an excellent job in Korea and that the MiG 15s' 23 and 37mm. cannon, while possessing greater firepower are not hitting anything, these sources state.

At the same time, they readily admit that our superiority in making kills is due not only to better armament systems, i.e., sighting instrumentation, control systems, etc., but in large measure to better training of the fighter pilot.

▶**The Final Equation**—Therefore, these armament experts state, it's not necessarily the largest caliber weapon that counts in aerial gunnery combat but:

- **How the equipment is used.**
- **The mission it is to perform.**
- **The complement equipment which makes it efficient.**
- **The platform on which it is used.**

This, they say, is the final equation for determining adequate firepower.

For the future, U. S. military aircraft ordnance and armament experts of all three services are completing coordinated development of a new family of armament designed to meet the needs of trans and supersonic aircraft.

▶**Navy Makes Tests**—Air Force at present is conducting comparison tests of a new 20mm. against the .50cal. to determine which is the most effective armament for the North American F-86 Sabre. USAF officials say, however that, even if the cannon should prove out in the case of the F-86, it would be some time before the new weapon will find its way into combat.

Similar tests are underway by Navy.

And officials of that service say that the new cannon, with a considerably increased rate of fire, is programmed for its new carrier planes.

The Australian government has disclosed that its new Avon-powered F-86 Sabre version will be armed with four 20mm. cannon.

Armament used aboard present combat planes in Korea are, almost without exception, the same guns used during World War II—the Browning .50cal. gun and the Hispano Suiza 20mm. cannon.

▶**Not Satisfied**—While some improvement has been made, notably in the .50cal. with an almost doubled rate of fire, both Navy and Air Force admit that the weapons are not wholly satisfactory as the speed of battle increases and battle moves up into the troposphere.

Tardiness in development of modern aircraft armament, the military explains, is largely due to the American public, which in peacetime years takes a dim view of arms research and development.

Lean military budget years following World War II, which in many respects retarded aircraft development and research, had an even more drastic effect on armament research and development.

In fact, virtually no money was provided by Congress during postwar years 1946 through 1949 for armament development. In 1950 fiscal year budget, that lack began receiving some attention, and during the last fiscal year these funds were greatly augmented. However, another 12 months will pass before the money allocated almost two years ago for guns, etc., will result in major production and operational combat equipment.

▶**The Problem**—Pared to its bare essentials, the fighter plane is a weapons platform for guns and the bomber a weapons platform for defensive armament. And rate of fire is paramount.

Until recently, the aircraft manufacturer was busily developing his aircraft and the ordnance expert was busily developing his guns and neither was particularly concerned with requirements and problems of the other.

During World War II, the comparatively slow B-17 Flying Fortress was adequately armed with its .50cal. guns. By the same token, armament of the Nazi aircraft was adequate in meeting the B-17.

Following the war, development of aircraft began moving ahead of armament. Today the B-47 grosses almost three times that of the B-17 and flies at altitudes 15,000 ft. higher and at half again as much speed. Wing and fuselage skins are thicker and less vulnerable to enemy firepower for that reason and there also is heavier armor around vulnerable areas.

In addition the rate of closure of modern fighters and bombers and low visibilities at the very high altitudes at which they fight are rapidly obsoleting present-day equipment and sighting mechanisms.

▶**Muzzle Velocities**—What is needed, speaking of the guns alone and not their accompanying fire control systems, are higher muzzle velocities. As speeds of aircraft increase—and assuming fire control and sighting mechanisms development keep abreast—the traveling time of a weapon projectile to target must be increased if kill probability is to be maintained.

With present-day weapons, required increases in muzzle velocities are almost prohibitive. Only the limited aspect of war in Korea has let air superiority remain with the U.N., some authorities flatly admit.

For example, armament experts estimate that if the muzzle velocity of the .50cal. were upped again by 50%, the present weight of the weapon would virtually have to double. As muzzle velocity increases, the rate of fire decreases proportionately. In addition, if such a decision for manufacture were made, then the number of weapons carried aboard a fighter would have to be greatly reduced.

▶**Guided Missiles**—Because rate of fire of present-day weapons is of primary importance, an impasse is nearing.

As a result, the weapons designers and makers are turning to other defensive and offensive aircraft armament —the guided missile.

The guided missile, which already has come a long way since World War II, is the most obvious answer to the dilemma which faces the armament and aircraft designers and builders. It could obviate the need, for the most part, of expensive and very heavy fire control systems and guns.

At the same time, of course, the guided missile for air-to-air use is still in the highly experimental state. Such weapons are reported "near" and, as previously reported by AVIATION WEEK, Hughes Aircraft is now developing the control system for an automatic piloted interceptor which carries a human monitor. Weapon of the new interceptor is an air-to-air guided missile.

▶**Armament Scramble**—Other armament manufacturers are rapidly gaining prominence in this peacetime-neglected field. Oerlikon Tool and Arms Corp. of America, headed by former USAF deputy chief of Staff for Materiel, Gen. K. B. Wolfe, for example, is "opening for business" in the United States and has offered the USAF a complete line of aircraft machineguns and guided missiles designed solely for aircraft use.

Meanwhile, another indication this nation is moving towards rockets and guided missiles for air-to-air combat is the equipping of fighter and bomber planes with self-contained weapons.

The Northrop F-89D incorporates a number of rockets in streamlined wingtip containers, shaped like tanks utilized for fuel storage. And the Republic F-84 is equipped to carry 32 aircraft rockets in place of bombs.

▶**More Tests**—Air Force is also experimenting with air-to-air missiles for defensive armament aboard the B-36 bomber in place of the conventional machineguns (AVIATION WEEK, Feb. 26, 1951) and the Navy is testing practicability of rockets fired from internal wing mounts.

For the time being, nevertheless, look for slightly increased calibers and muzzle velocities in present type weapons until guided missile weapons—still some time away—reach production status. There will be growing emphasis on pre-aimed rocket missiles, not only for air-to-ground use but for air-to-air, as combat altitudes continue to rise.

Aircraft Sales

●95% of industry effort in 1951 military production.

●Volume of 15 top firms $2.8 million; profits down.

Fifteen biggest U. S. airframe, engine and propeller companies reported a combined sales volume approximating $2.5 billion for 1951 compared to 1950 sales of $1.8 billion. It was the largest volume sale since the end of World War II.

Although the manufacturers were pushed by demands for a bigger Air Force and more Navy air as a result of the Korean conflict, Aircraft Industries Assn. pointed out that at the end of 1951 not a single combat plane ordered since the outbreak of the Korean war has been delivered. This was due to the long lead time required to produce a modern high-performance military plane.

Profits in 1951 will be substantially less than the $83.5 million reported by the same 15 companies in 1950. The reduction is attributed to effects of excess profit tax, shortages which delayed deliveries, strikes, rising wage rates and increased costs of hiring and training new employes.

▶**Slow Buildup**—In 1951 the U. S. aircraft industry built 4,500 to 5,000 military airplanes, as compared with 3,000 the preceding year. Aircraft Industries Assn. estimated this production total in its New Year's Day summary of the state of the U. S. aircraft industry.

The slow build-up of actual com-

pleted planes has been the subject of congressional criticism and has resulted in a shakeup of the top mobilization heads at year's end. The AIA analysis attributed the slowness of the production increase to the fact that delivery of end items, such as completed aircraft, had not received "first" priority.

Efforts to broaden the U. S. industrial base for larger production in the future will show more results in the months to come, it was predicted.

▶ **Civil Backlog**—Approximately 95% of U. S. aircraft manufacturing efforts were on military production. Meanwhile unfilled orders for high performance new civilian transport aircraft approached 500, believed to be the largest backlog figure in the industry's history, numerically from a dollar and airframe pounds basis, it certainly is the largest, although figures on these aspects were not reported.

Rapid growth of the U. S. helicopter industry was cited as a significant development of the last year in aviation. Current backlogs are in excess of $500 million for the rotary-wing craft, with unfilled orders much greater than in any previous year.

Forecast was for radical new developments in the field to continue. Also predicted was continued rapid growth in helicopter utilization—both military and civil—whenever civil helicopters in quantity can be made available.

▶ **Civilian Cut**—Materials curtailments on light utility, business and agricultural aircraft cut production on these planes to the lowest ebb since World War II, approximately 2,000 planes. This compared with approximately 3,000 produced in 1950. However, the market for the smaller planes was approximately 4,000, marking the first time since the immediate post-war period that demand had been greater than supply.

Production of 65 commercial transports and more than 50 smaller twin engine executive types in 1951 compared with 75 and 22, respectively, in 1950.

Acute shortages of vital machine tools and on critical alloys were named as basic cause for the production lag on meeting military aircraft schedules. The shortages are particularly severe for engine and accessory manufacturers, thus delaying the delivery of completed airplanes.

▶ **Expansion**—A survey of 12 of the major airframe manufacturers discloses that they are presently using more than 45 million sq. ft. of floor space. These same manufacturers are now adding an additional 15 million sq. ft., either through reactivation of World War II facilities, expansion of existing facilities, or the construction of new facilities.

It is expected this additional 15 million sq. ft. of space will be in production during the forthcoming year. These same 12 companies during their World War II peaks were utilizing slightly more than 66 million square feet of floor space.

Production Czar

• Clay Bedford given plenty of over-all authority.

• But he is expected to tackle bottlenecks singly.

A change in Washington mobilization signals, aimed at breaking loose the production logjam on aircraft and other critical war programs is moving a new production czar into a post in the Defense Department which is virtually secondary only to Defense Secretary Robert A. Lovett himself.

The new czar, who will have the official title of Expediter of Military Production, will be Clay P. Bedford, executive vice president of the Kaiser-Frazer Corp.

During the last six-month period he has been on loan to Defense Mobilizer Charles E. Wilson as "Electric" Charley's No. 1 bottleneck buster.

Officially he has been Deputy Administrator of Defense Production Administration, and chairman of the Production Committee. In this job he had been working very closely with aviation's Harold (Bill) Boyer, chief of the Aircraft Production Board.

▶ **The Job Ahead**—Bedford is expected to follow a program of licking one problem at a time, but he will have reasonably complete authority to draw the still-competitive procurement programs of the three military services into a workable plan.

In the top bracket of "urgencies" that already have been set up for production programs under the new Bedford regime, are such items as jet aircraft, atomic weapons and tanks. Presumably the B-47 jet bomber program, the F-86 fighter program and any other fighters which will be first-line against the Russian MiG-15 or its successors, will get first call.

But even the top-priority programs will not be permitted to compete with each other. For the time-being, the broaden-the-base program of which Mobilizer Wilson spoke so highly, will be sidetracked to get production really rolling on the most essential programs, one plant at a time.

In the case of jet engines, for example, the plant closest to full production already will get its tooling completed, even at the expense of other sources. After it is rolling, the second plant will be prepared, and others later, in like manner.

Behind the new Bedford move is a fire-eating Texas senator, Lyndon Johnson, whose committee blasted the sluggish military production program off dead center with a scathing criticism of its failures (AVIATION WEEK Dec. 3, p. 13).

▶ **Demanded Czar**—Johnson called for appointment of a production czar who would coordinate the procurement of all three services. He practically suggested that Munitions Board Chairman John Small was the man for the job, but Small was by-passed by Wilson and Lovett in favor of Bedford. Nevertheless the Bedford appointment is in direct answer to the criticism from Johnson.

Not quite clear in the new picture is the place of Col. Alfred Howse, Wichita business man and procurement figure in the AAF in World War II, who is being named as Director of Procurement and chairman of a new Procurement Policy Board to oversee contracts placed for highest priority implements of war.

Some sources say that Howse was first tapped for Bedford's new job when it appeared that Bedford was going back to Kaiser-Frazer, and that his new procurement spot was set up as an afterthought, when Bedford agreed to take on the production assignment.

But Howse is described as a capable, experienced procurement man, who finally ended up administrating war surplus property disposal after World War II.

Presumably both he and Bedford will coordinate closely in the new setup and Howse will supervise the new procurement programs and changes in existing ones, while Bedford works on the more immediate troubles of getting already existing firm procurement programs steamed up to the full production scheduled.

▶ **Bedford Successor**—Place of DPA Administrator Manly Fleischmann in the new revised mobilization setup has not grown any.

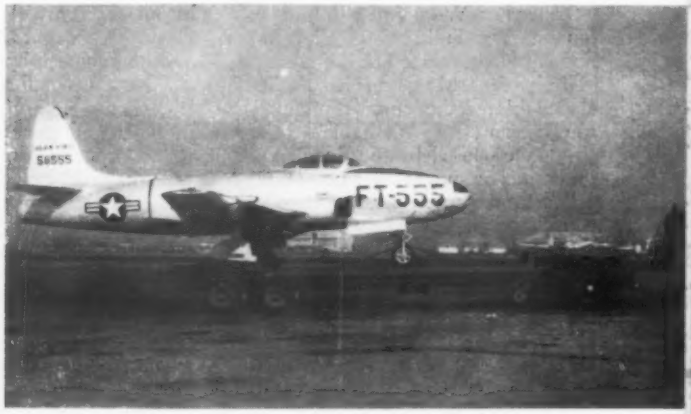
It will remain unchanged, except that he will now be charged with doing his job of doling out materials, tailored to fit the urgency measurements laid down by Bedford and his successor as chairman of the DPA Production Executive Committee.

Slated for this chairmanship is William L. Campbell, vice president of Food Machinery and Chemical Corp. He, along with Bedford, and APB chief Boyer, have been touring defense plants over the country in preparation for the new assignments.

Defense Needs More Scrap

EXTRA BOOST ON BANSHEE—This McDonnell F2H-2N Banshee all-weather fighter has been fitted with short afterburners to provide extra boost on demand. Plane is assigned to test section at Navy's Patuxent Air Station. It does not have its large tiptanks.

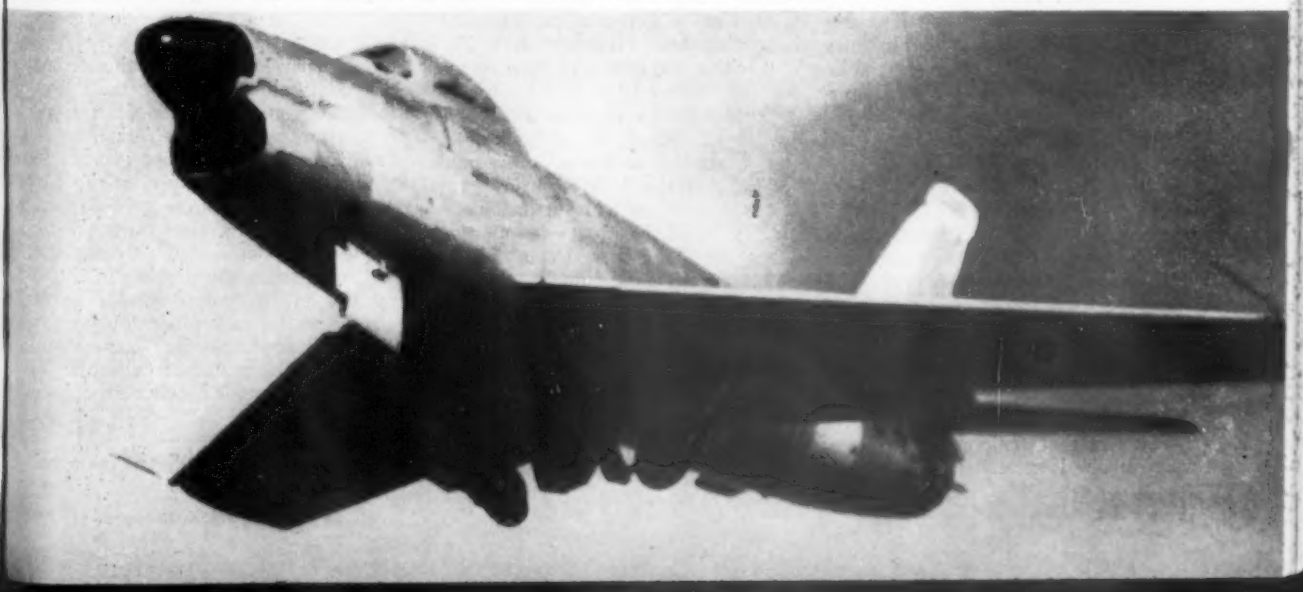
Military Aviation Picture Highlights



SHOOTING STAR GETS A LIFT—F-80 jet fighter, one of a number being overhauled by Lockheed Aircraft Service at Burbank, Calif., is trucked to nearby Van Nuys Airfield for flight tests.

SCORPIONS SET FOR FLIGHT—Long lineup of Northrop F-89 Scorpions awaits production flight testing prior to delivery.

PRODUCTION F-86D TAKES OFF—Below, a production model North American F-86D Sabre all-weather fighter tucks up its wheels after leaving Los Angeles International Airport for Muroc for further tests. Previous F-86Ds were trucked to Muroc.



FINANCIAL

Local Service Lines Come of Age

Growth and financial strength indicate success of CAB 'experiment,' but continued mail support is needed.

Recent developments on various fronts highlight the growth and strength of the local air service "experiment."

In keeping with a suggestion from the Civil Aeronautics Board, West Coast Airlines has filed a proposal to acquire Empire Air Lines through merger. A previous attempt to merge West Coast and Southwest Airways was turned down by CAB on the grounds that a combined carrier would develop trunkline operations along a route already adequately served.

Instead, a West Coast-Empire combination was indicated as more logical and likely to gain official approval.

► **Desirable Mergers**—This circumstance places the current proposal in the category of "desirable" mergers strongly espoused by the Board. While other merger proposals among the so-called trunk carriers are receiving active consideration, it is likely that none of these will move with the dispatch and decisiveness which will attend the West Coast-Empire consolidation.

In addition to normal obstacles present, such as management considerations, the existence of permanent franchises among the trunk carriers places one of the biggest stumbling blocks in the way of effecting desirable mergers or combinations in this group. And competing carriers invariably can show their interests as placed in grave jeopardy by proposed combinations of other trunkline operators. This has impeded previous attempts at consolidation and may be expected to remain a major factor in future proposals.

In addition, no matter how desirable mergers may be among such trunklines with permanent certificates of public convenience and necessity, CAB cannot compel such combinations.

► **CAB Power**—But effective means are available to the Board in effecting consolidations among the local service lines holding so-called temporary certificates. It is highly significant that the only bona fide merger since the enactment of the Civil Aeronautics Act of 1938 concerned three feeder airlines holding temporary certificates of public convenience and necessity. The carriers involved were Monarch, Challenger and Arizona, which were merged to form Frontier Airlines as of June 1, 1950.

The fact that temporary certificates were involved greatly facilitated this logical combination. The absence of intangible permanent franchises created no artificial illusions as to value which could have led to a collapse of the transaction.

Because of its effective control over this franchise value, CAB can indirectly pressure and induce mergers. For example, the extension of temporary certificates and realignment of route patterns would be granted more readily to those carriers consenting to constructive mergers. Of course, the rate-making power in establishing mail compensation is an over-riding consideration, and its influence by the Board on feeders is not insignificant.

► **Economy Considerations**—Where proposed combinations are premised on sound economic and geographic premises, material cost-savings are possible. For example, it may be found that considerable duplication of terminal expense at common points can be eliminated. There are other normal benefits and economies that come with greater size and permit more intensive utilization of facilities and a broader base over which to distribute overhead burden.

It is important to note that lower unit operating costs resulting from consolidation would mean that the mail pay now required by the carriers as separate entities would be materially reduced. This factor would receive the support and endorsement of CAB as long as natural communities of interest prevailed in the combination.

It is against this background, that a speedy consummation of the West Coast-Empire merger proposal may now be anticipated. Moreover, it is likely that within the next year other mergers may be advanced by other locals.

► **Broader Financing**—The local service carriers are also coming of age in obtaining a greater participation in public financing. Recently Wisconsin Central Airlines announced that it had successfully sold 61,667 shares of additional stock at $2.75 per share, realizing approximately $169,500. The proceeds are to be devoted to augmenting working capital and for the purchase of additional radio equipment.

The largest financing of any of the locals is about to be consummated by Pioneer Air Lines, Inc. The company has placed in registration a new stock issue of 120,000 shares which may realize for it, at current market levels, from about $1,260,000 to $1,320,000. In addition, Pioneer has arranged for a five-year bank loan of $2,450,000.

These new funds, together with the sale of municipal bonds held in current assets and amounting to $226,090, along with the proceeds of the sale of its DC-3 aircraft, will make possible the financing of a $5-million expansion program. This expansion is represented by the acquisition of nine Martin 2-0-2As, supporting spares and other equipment from the Glenn L. Martin Co., along with training and transition costs.

It is significant that a local has outgrown its DC-3s and been forced to seek higher density-seating aircraft, represented by the 36-place 2-0-2A.

► **Mail Rate**—With the filing of its registration statement, considerable background data as to its development is revealed by Pioneer. For example, the company's dependence on mail pay has shown a steady decline. For 1946, the company received the equivalent of 55.29¢ per revenue plane mile in mail pay. For the first nine months of 1951, this had averaged but 28.42¢.

It is expected that the introduction of the Martin equipment will result in a substantial increase in operating expenses, which will necessitate a higher mail rate. The company indicates that it will file for this increase with CAB.

The support of the feeders through the mail pay device is as strong as before, if not stronger, despite CAB's administrative separation of service mail payments from subsidy for all U.S. domestic airlines. All the separation accomplished was to identify the element of subsidy.

The Board and the Senate Interstate and Foreign Commerce Committee recognized that the locals and other carriers may require a higher degree of support mail pay than the domestic trunklines. Further, the assertion has now been made that subsidies paid the feeders are really subsidies to the communities served. This may serve to protect and enhance the position of the local service airlines.

New developments in the temporary certificate category are most likely to come from the award of a five-year authorization to New York Airways, Inc., to conduct a helicopter service for mail, cargo and passengers in the New York metropolitan area.

In this instance, while private financing has been indicated as completed, public interest may develop in the securities of the company. Of greater significance, a new phase touching on the local service airline "experiment" may develop from this helicopter authorization as added service experiences are recorded.

—Selig Altschul

A Defense Appeal: Scrap for Steel

The quality of Eaton Jet Engine Blades

is assured by newly developed Eaton production processes

As a supplier to aircraft engine manufacturers for many years, Eaton is thoroughly familiar with the problems involved in producing parts to meet the exacting requirements of the industry. We are also accustomed to the developing of specialized production machinery and processes when this is necessary to meet quality standards and hold costs to a minimum. In our jet blade plant, greatly expanded facilities include exclusive Eaton developments in metallurgy, fabrication, and testing—all combining to produce blades of highest accuracy under strict metallurgical control.

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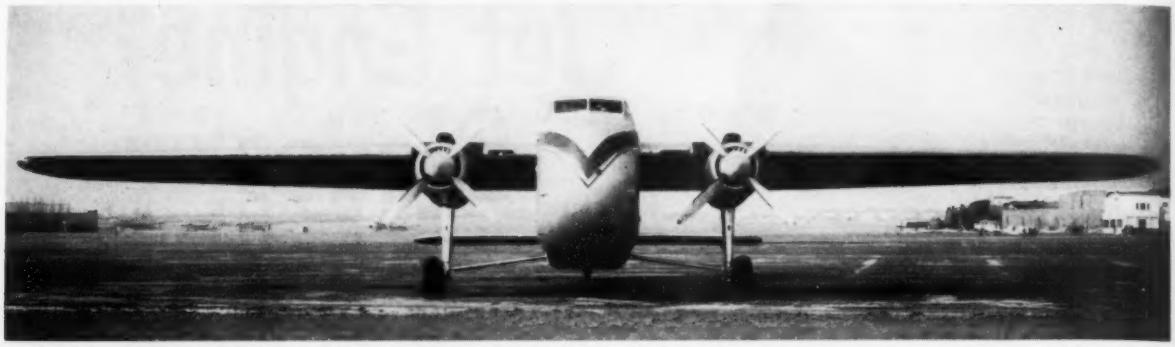
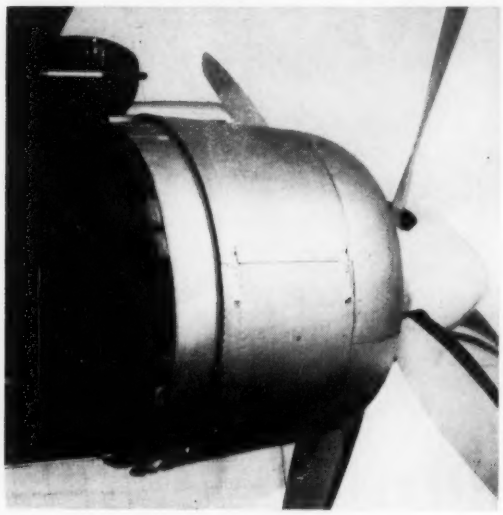
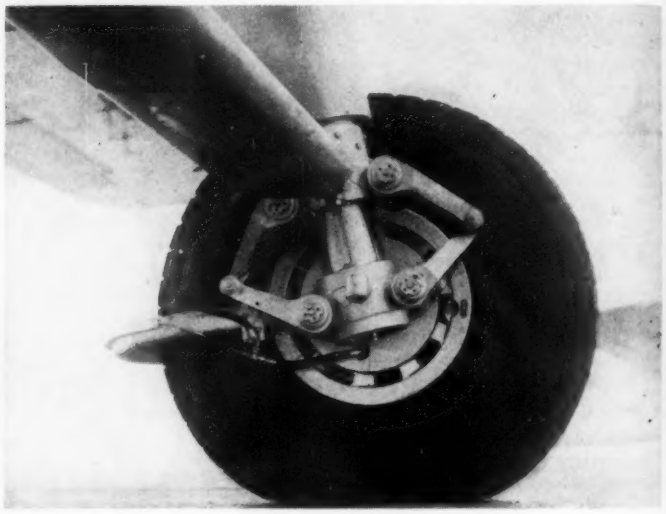


MEDIUM CARGO CARRIER is the Mk. 31 version of Bristol's Type 170 Freighter, with increased power from twin Hercules 734 powerplants. Fixed landing gear has been strengthened to handle increased gross weight.





Two Cargo Aircraft RAF Wants to Buy: Bristol Freighter and . . .

By David A. Anderton

The Royal Air Force's long-ailing Transport Command may soon get a needed transfusion in the form of orders for two British freighters:

- **Blackburn and General Aircraft** GAL 60, four-engined behemoth currently undergoing flight trials for the Air Ministry.
- **Bristol Type 170 Freighter,** twin-engined cargo-hauler recently ordered in quantity for the Royal Canadian Air Force. The Freighter will now be in service in British Commonwealth countries on every continent.

These two planes represent heavy and medium cargo carriers, types completely missing from RAF rosters.

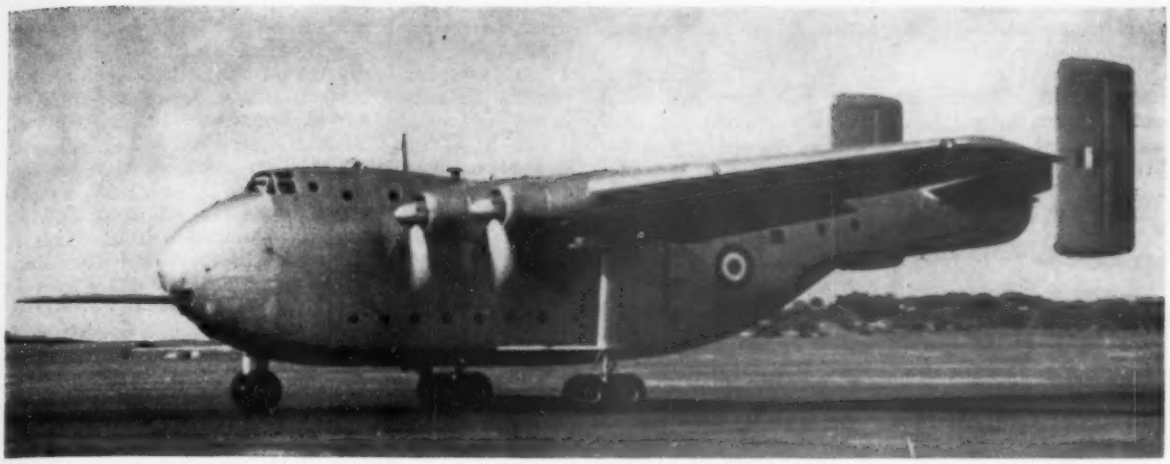
Production orders for either of these craft would not only strengthen the RAF, but would also make a positive contribution to NATO air power. And, say NATO officials, deliveries of either type would take some of the heat off the loud demands for Fairchild C-119 aircraft from the U.S.

► **Crusaders**—The fight for freighters for Transport Command has been spearheaded in Parliament by Air Commodore Vere Harvey. The ranks behind Harvey have been filled by aviation enthusiasts and their technical press.

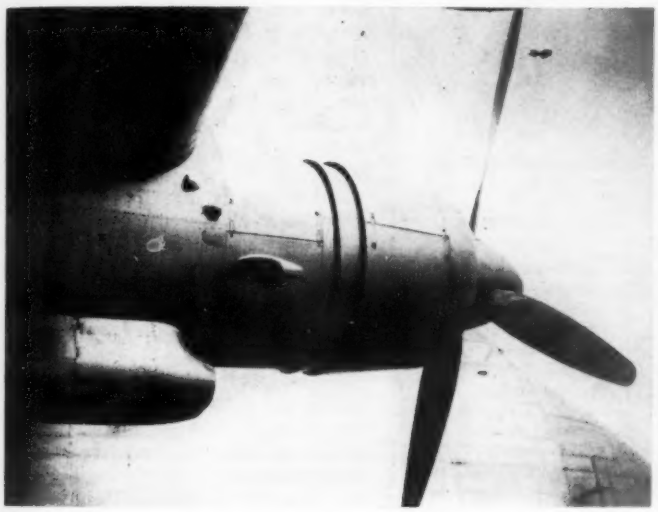
They didn't get much support from the former Labor government, which was apparently counting on the delivery of C-119s, or even C-82s, from the U. S. But reports from London say that delivery of Fairchild Packets would most probably be impossible, even now.

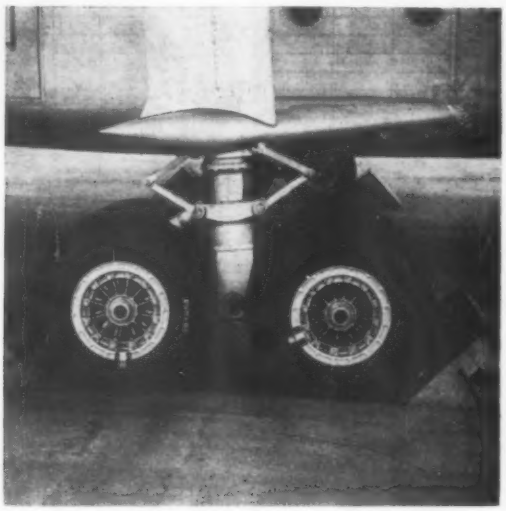
There are still some drawbacks. The big Blackburn couldn't possibly be delivered in any quantity before 1954—the second prototype craft has yet to be completed. Bristol is in continuing production of the Freighter and has a large backlog of orders which must be filled. And some observers feel that the Bristol job has limited usefulness because of its front-opening doors—cargo could not be jettisoned while craft was in flight.

U. S. technicians, accustomed to seeing cargo carried in sleek-looking craft with retractable landing gear, are apt to scorn the high-wing, fixed-gear layouts of both the Blackburn and Bristol. But the scoffers are referred to recent trials where the Blackburn freighter competed with a Fairchild C-82 Packet and a Handley-Page Hastings. The task was to fly a load of heavy Army equip-



HEAVY CARGO CARRIER, Blackburn's GAL 60 has excellent short-field performance. Annular slots in detachable Hercules power egg handle cooling airflow. Fixed bogie landing gear has low footprint pressure for unimproved-field use.





. . . Blackburn and General GAL 60

ment into a small grass field and out again.

The Freighter did the job; the Packet and Hastings pilots both refused to attempt the landing.

▸**Blackburn Design**—The GAL 60 is a high-wing monoplane with fixed landing gear and four Bristol Hercules 730 piston engines rated at 2,020 hp. for takeoff. Span is 162 ft., overall length is just over 99 ft. and it reaches 33 ft. into the air. Gross weight for takeoff is 105,000 lb.

Primary design purpose of the big plane was to carry large and very bulky loads over relatively short distances. The main freight hold is a cathedral-like affair with a vaulted roof that towers above the head of any observer. Capacity of the spacious cavity is 5,760 cu. ft. Forward, the headroom is 10 ft., but 25 ft. aft it increases to 15½ ft. Overall length of the hold is 36 ft., and width is 10 ft. Access is by a rear ramp nearly the width of the fuselage.

An auxiliary rear deck can be fitted which gives an upper rear compartment with a headroom of 5½ ft.

Typical loads which can be carried include 81 troops, 38 paratroopers and supply containers, 48 stretcher cases and six medical attendants, or nine British Ford jeeps.

The crew numbers four—pilot, co-pilot, navigator and radio operator. The latter two have a separate compartment behind the cockpit; their seating is back-to-back on the left side.

▸**Conventional**—Most of the Blackburn job is conventional aircraft structure. But it's been a long time since any fixed landing gear was designed for such a large craft, so some of the details may be of interest.

The landing gear itself is a Lockheed (British, not the American firm) design, with a twin-wheel nose gear and two four-wheel bogie main gears.

The nose gear transmits its loads into the fuselage through bolted connections with some extra structure in the lower fuselage nose. Between two front bulkheads are mounted a pair of fore-and-aft webs. A bracket is bolted between these webs which braces against the rear face of the forward bulkhead. The top fitting for the nose gear is bolted through the forward face of this bulkhead into the bracket.

At the bottom of the bulkhead is another fitting which braces the bottom portion of the landing gear.

Loads on the main landing gear leg

are transmitted into the wing through a ball joint. Lateral bracing between leg and fuselage is in the form of a built-up triangular sponson. The spherical joint at the top of the leg is made between the ball on the leg and a socket joint which is formed in a vertical tapered section. This section is bolted to the wing spar at the inboard engine bay.

► **Powerplants**—Each of the four Hercules engines is installed as a complete power egg. Powerplant and accessory bay can be removed from the airplane as a complete unit. The accessory bay contains the engine-driven accessories, fire extinguishing system and oil system.

The photograph of the powerplant shows two annular cooling air exits. This is part of the cooling system of the Hercules engines, which consists of a fan to provide the additional boost for the cooling air flow, internal baffling, and the annular exits. The forward one handles the airflow over the cylinder heads; the aft exit discharges cooling air which has passed over the barrel of the cylinder.

Wings and tail are thermally de-iced; heat for this comes from four auxiliary combustion heaters. These units are located in the leading edge of the wing, and are reached via crawlway through the wing. Each wing root also contains a heater for cabin heating.

► **Mark 2 Freighter**—Blackburn has announced a proposed Mk. 2 version of the GAL 60 which would utilize Bristol Centaurus engines and have a new tail-boom and rear loading scheme. No dimensional changes occur except in the region of the rear loading door. Gross weight would be upped from the current value around 105,000 lb. to 127,000 lb. And the increased power would jump the payload to 29,120 lb. for a range of 1,000 nautical mi. with all fuel allowances for diversion or reserve.

The cargo hold length and width remain the same (36 ft.x10 ft.) but the overall height is made constant at 10 ft. The tail would be carried on a boom of circular section, and clamshell doors (a la Packet) would be used instead of the current arrangement of ramp door. Twin loading ramps are used; they may either be folded and housed within the contour of the doors, or removed and stored in the freight hold.

Some idea of the size of the tail-boom—and in fact of the whole airplane—can be gotten from the fact that the boom will seat 19 people, two less than a standard DC-3 fuselage. Additional space for five passengers can be made on the flight deck, but this means that the radioman and navigator get crowded forward into the cockpit of the plane.

A portable companionway gets the passengers from the cargo hold into the tail-boom.

► **Centaurus Engines**—The engines slated for the Mk. 2 are the Centaurus 171, rated at 2,940 hp. for takeoff, with water and methanol injection. Supercharging is single-stage, single-speed.

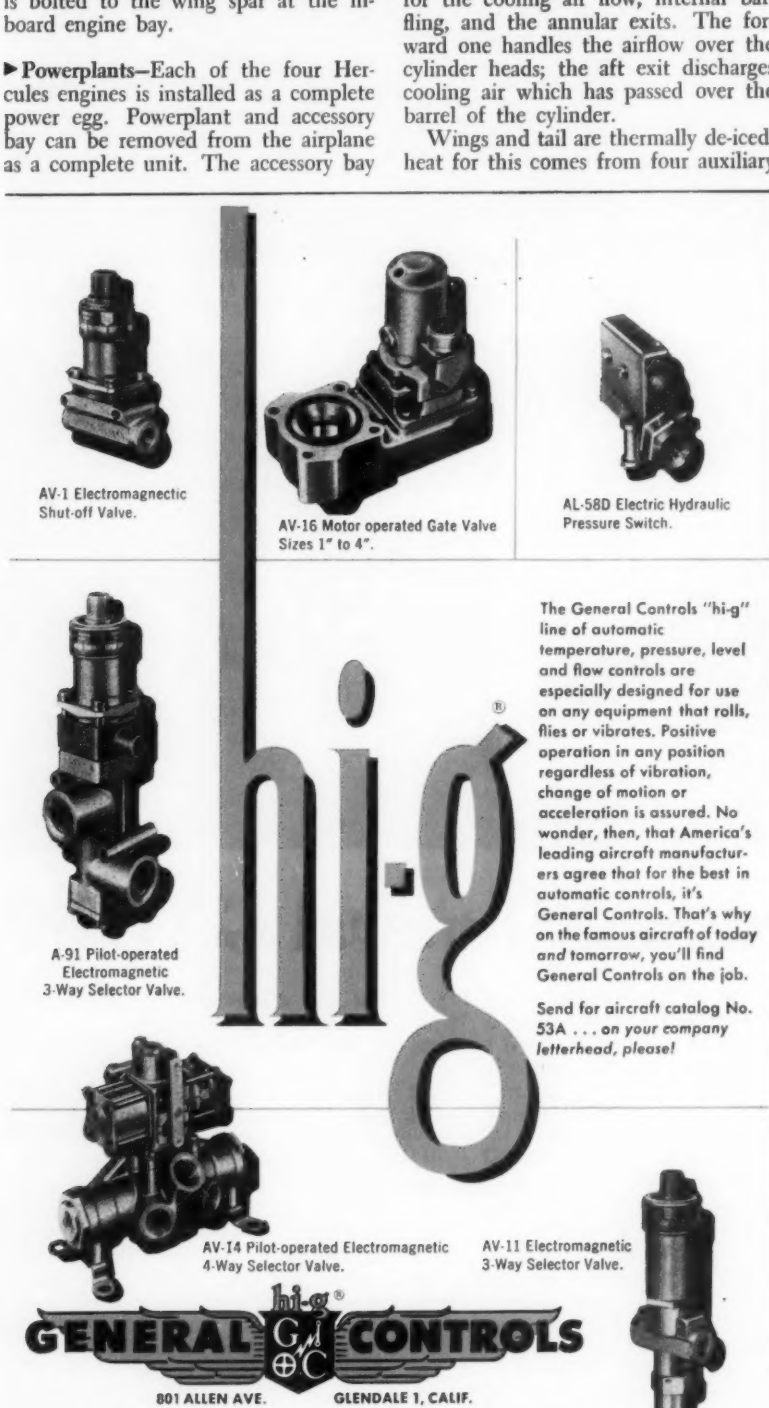
If the customer desires, three alternate powerplants can be fitted. These are the Pratt & Whitney Double Wasp CB-17 or Wasp Major B-13, or the Wright 749 C-18BD1.

Propellers are four-bladed; diameter is 14 ft. 6 in. De-icing is electrical. All units are fitted with reverse pitch, and full engine power can be used for braking. Design of these controls will not permit asymmetric power application in the event that one prop doesn't go into reverse pitch.

Flexible fuel tanks are installed and provision is made for the use of pressure refueling at a rate of 200 gpm.

► **Bristol Design**—The Bristol Type 170 Freighter is a high-wing monoplane with fixed landing gear and two Bristol Hercules 734 engines. Span is 108 ft., overall length is 68 ft. 4 in., and height is 21 ft. 6 in.

The Freighter weighs in at about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42,000 lb. New features include:

- **Hercules 734 engines,** rated at 2,000 hp. for takeoff.
- **Automatic propeller pitch device.**
- **Beefed-up landing gear.**
- **Added dorsal fin area** and horizontal tail span for better stability.
- **Enlarged cargo hold,** which comes about chiefly through the repositioning of nose door support tubes and widening of the rear bulkhead to 6 ft.
- **Increased fuel capacity,** which ups still-air range to 1,650 mi.

Maximum payload of the Freighter is currently given as 14,429 lb. Exact dimensions of the new hold are not at hand, but the earlier version of the Type 170 had about 1,700 cu. ft. capacity. The redesign could bring this value near the 2,000-cu. ft. mark.

A typical range-speed-payload figure for the Freighter shows that the craft can tote 10,000 lb. over a distance of 850 mi. at an airspeed of 166 mph. and an altitude of 5,000 ft.

These types, therefore, are the prospective workhorses of Transport Command. Ungainly, even ugly by esthetic standards, both planes have a rugged, functional appearance which underscores their adaptability to rough usage in the air and on the ground. So 1954 could see a greatly strengthened Transport Command flying these two tramp ships of the air and their sisters.

Westinghouse Plans 50% Expansion

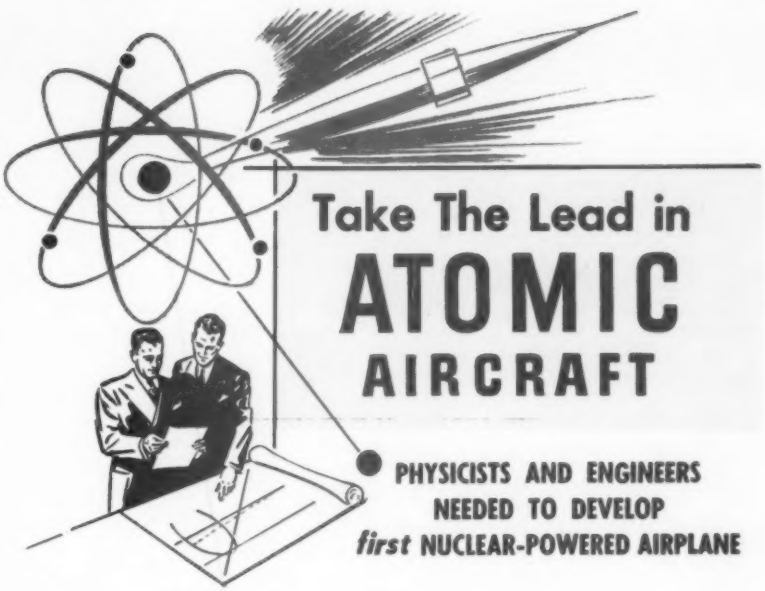
For the second time since the end of World War II, Westinghouse Electric Corp. is working on a major expansion program. This one, to cost some $296 million, is the largest in the firm's history, will up production capacity by 50%.

The company also began to integrate its defense activities by forming a Defense Products group which will oversee its plants making jet engines, atomic power equipment, aircraft armament, radar apparatus and other electronic gear and aircraft parts. A new Air-Arm division was delegated to develop and produce radar-directed fire-control systems and a new jet plane autopilot.

Although last year, Westinghouse's defense backlog for the military comprised more than 40% of all its unfilled orders, consumer goods production slipped only 10% from the record year of 1950. Design changes, switch to less critical materials and reduction of scrap losses were major factors in maintaining high consumer output.

Last September the 3,000th aircraft turbojet engine was turned over to the Navy by the company.

Although Westinghouse's sales for



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the first nine months last year were up 23% over the same period in 1950—to $901,042,000—increased taxes cut the company's net income 12.9%—to $42,757,000.

Thompson Expands

Its booming jet engine parts business has forced Thompson Products, Inc., to look around for still further production space and next on the list is the large former Cleveland plant of Lincoln Electric Co., welding equipment producer.

The 15¼-acre facility has been sold to Eddy-Coit Co. of Cleveland, which plans to lease it to Thompson for five years with renewal options for an indefinite period.

Thompson will take immediate occupancy of the entire plant except for approximately 180,000 sq. ft. which will be retained by Lincoln Electric until Mar. 15, 1952, and expects to be in production there next spring with an initial working force of about 1,000. The factory consists of seven main buildings.

Thompson's employment in December was approaching its World War II height of 20,000. Its 1951 sales of automotive and aircraft parts are expected to be near $190 million.

Official U. S. Navy Photo

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Such automatic indication of the ideal approach speed plus positive prestall warning answers perfectly the designer's problem of securing optimum landing performance as well as perfect prestall characteristics. Our engineering staff would be glad to discuss prestall instrumentation systems for your aircraft designs.

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291 Small Jobs

● 'Little guys' get total of $28 million air contracts.

● And AMC looks for more to ease load on big plants.

Dayton—Small business firms were awarded nearly 60% of $47.6 million worth of Air Force prime contracts selected as suitable for small business during the first five months of this fiscal year, according to a report at Air Materiel Command headquarters.

A total of 291 purchase requests on which action was completed formed the basis of a report from William H. Hine, small business specialist, AMC, to Maj. Gen. Mark E. Bradley, Jr., director of procurement and production.

Hine's report revealed that 115 small business firms received 143 advertised contracts valued at $5,168,512 and that 131 small concerns received 148 negotiated contracts with a face value of $22,691,636. The total for 246 small businesses was $27,860,148.

► **Eases Load**—Significant factor in this set of figures lies in the advance of smaller plants in the field of negotiation. The determination that many smaller manufacturers are capable of meeting Air Force standards on quality and delivery not only is spreading the defense dollar, but increasing the military production base while simultaneously easing the load on larger plants currently engaged in defense work.

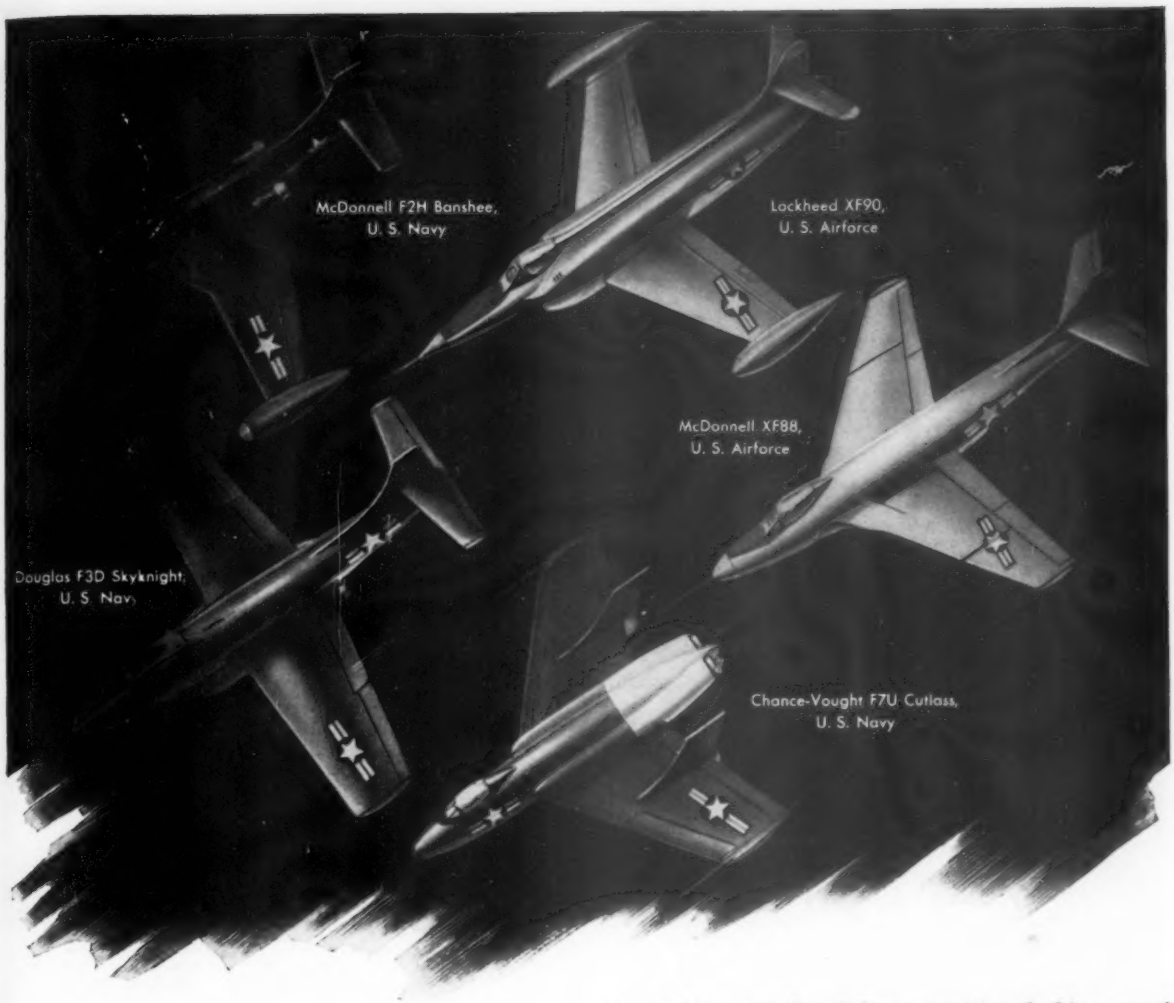
Biggest factor in the advance of small business is the "screening" of purchase requests prior to procurement action. All unclassified purchase requests of more than $10,000 are reviewed by analysts.

Those requests deemed suitable for small business are so designated and efforts are made by the small business staff to obtain widest participation in the bidding.

► **New Producers**—In cases where a purchase request, previously determined suitable for small business, results in a contract with a large firm, the buyer must fill a written justification for his action.

This accounts for awards to big business which for justifiable reasons could not be given to small concerns, although pre-procurement screening indicated small business could produce the items.

This concentration on aiding small business has brought a great many new producers into the contractor fold. In June, 1951, Hine reported, 186 small firms which never had contracts before were given awards. A total of 81 more new small contractors were given prime



Five Sound Reasons...

for America's Air Might

All of these first-line fighters combine flashing speed with top dependability—characteristics that mark them as outstanding military aircraft. Significantly, each is powered by two Westinghouse turbojet engines.

In addition to the already famous J34, Westinghouse research and engineering skill has developed the J46 and the J40, big brother of the Westinghouse jet engine family and the most powerful turbojet engine known to be in production anywhere.

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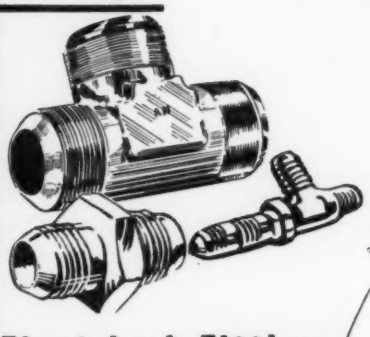

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contracts during the following five months, Hine said.

▶**The Little Fellow**—"The results of cooperation between the small business analysts and AMC buyers has developed some very interesting facts," Hine added. "For one thing, it shows definitely that small business can compete in bidding with big business on items adaptable to the small plant.

"Our figures show that these 'little fellows' are being awarded 80% of the contracts and approximately 60% of the dollar value on procurements within the capabilities of small concerns."

Two important guideposts point up an increasingly larger role by small business. They are:

• **Price differentials.** The controller general has authorized the employment of price differentials in negotiated procurements "when justifiable to accomplish the objective of broadening or maintaining the industrial base of suppliers." When applicable, this procedure is being followed by AMC buyers.

• **Subcontracting.** In making awards on major prime contracts, buyers are compelled to give consideration to those firms—within a tight bidding range—who indicate intentions of doing the greatest amount of subcontracting. The subcontracting field largely is dominated by small business and this factor should throw more business their way when Air Force procurements begin to hit the peak activity this fiscal year.

Research Wanted On Aircraft Plastics

Dayton—Use of plastics for airframe, guided missile and aircraft engine parts looms as a future possibility—but not on a grand scale until much more development is completed.

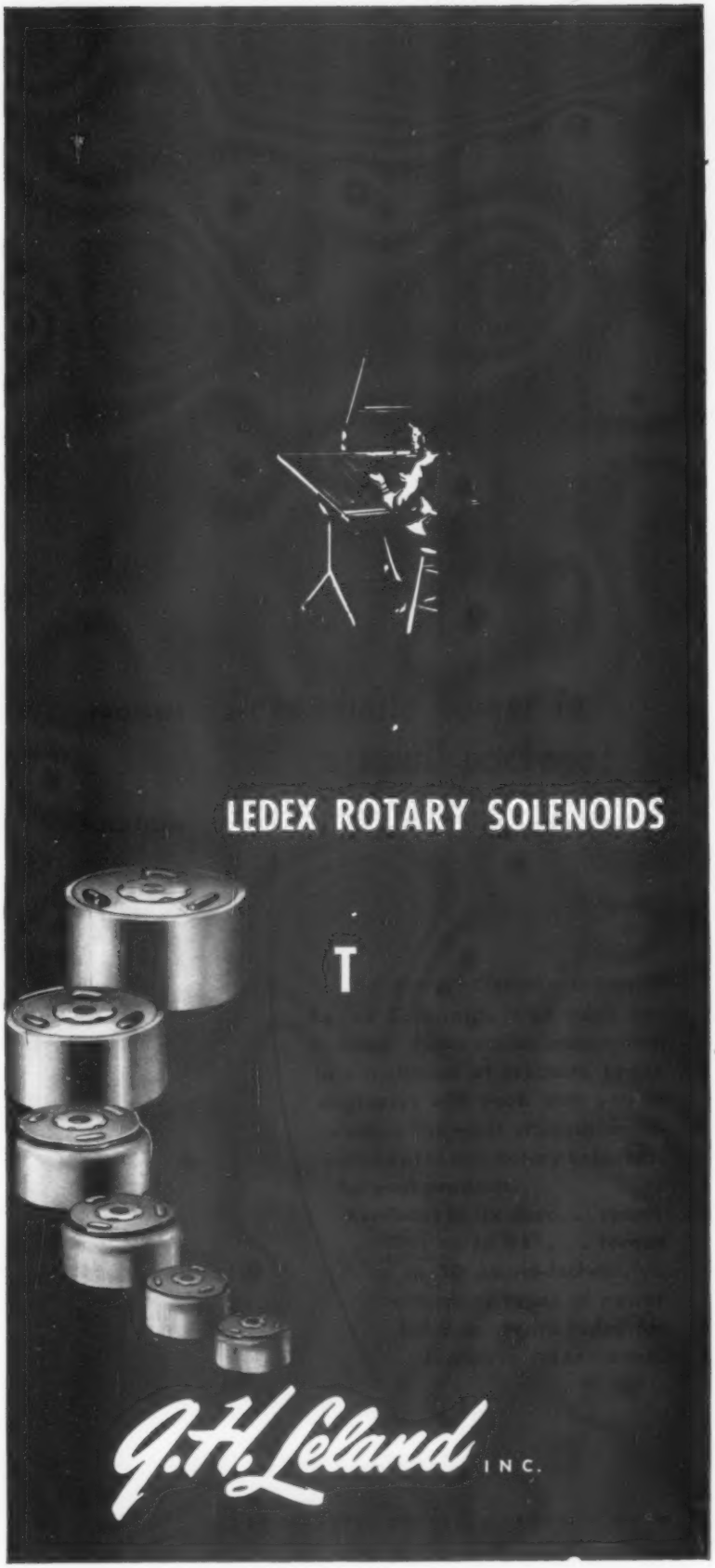
This appeared to be the general reaction following a two-day conference here, jointly sponsored by the Aircraft Industries Assn. and Air Force. Among the activities:

• Advances in the plastics field were outlined in papers presented by specialists representing major producers.

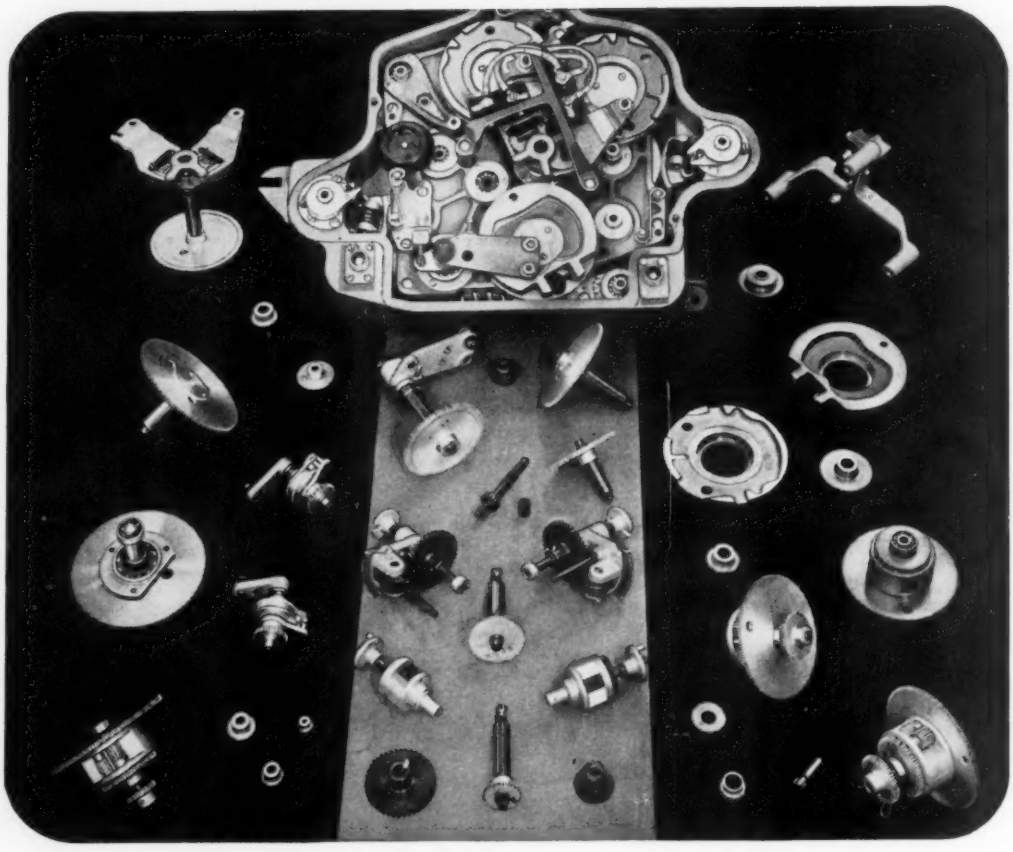
• A panel of spokesmen for airframe, guided missile and aircraft engine manufacturers offered a framework of minimum performance requirements needed before plastics become a major factor in replacing critically short materials now in use.

▶**Research Needed**—Both factions conceded an immediate need for a mammoth research program. It would have to be financed on a "pool" arrangement, based on standardized test procedures, and aimed at certain of the basic requirements.

The basic requirement suggested was retention of room temperature strength



In a "control unit" the need for PRECISION points to **STEEL PRODUCTS ENGINEERING!**



from the smallest gear to the largest assembly

For a precision assembly such as this control unit, for aircraft and similar mechanisms of intricate parts—gears, cams and differentials—must be built to exact tolerances. Aircraft engineers know they can depend upon Steel Products for the precision workmanship required in design, manufacture, assembly, and testing of complex units like this. "For precision contract manufacturing, in aircraft, ordnance, or other industries you can depend on the 'know-how' and proven ability of Steel Products."

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in 500-deg. heat for ten consecutive hours.

From that starting point, however, the development will be specialized to accommodate requirements peculiar to the various airplane components. Guided missiles, for instance, would require greater heat resistance—up to 700 or 800 degrees—but for much shorter intervals. Jet engines would require generally less heat resistance, but a much longer period of stress retention.

Scattered practical applications for plastics already are in use, one being plastic tubing on a major de-icing system going into newer models of a jet fighter. Plastics in this case replaces stainless steel tubing used on previous models and has proven to perform up to requirements.

Engine manufacturers profess a real interest in plastics development because powerplant components can be produced for about one-quarter of the cost involved in steel parts. A decided advantage in incorporating plastic blades, it was pointed out, is that failure of one or more blades in actual use will not tear up a jet engine as do failure of 12% chrome stainless steel blades.

▸**Panel Members**—The panel consisted of R. L. Whann, North American Aviation; D. M. Hatch, Jr., Hughes Aircraft; B. L. Molander, North American; John Goldthwaite, Allison division; C. R. Lemons, Douglas Aircraft; L. M. Perdue, Boeing Airplane; R. C. Raab, Glenn L. Martin Co., and T. J. Jordan, General Electric.

Air Research Hits Peak at Cornell

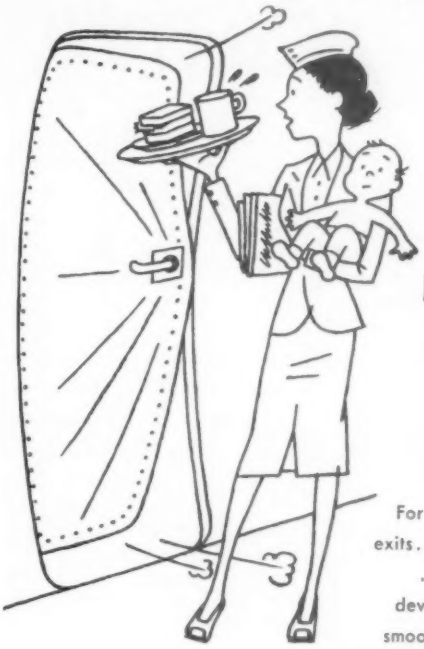
Cornell Aeronautical Laboratory, Buffalo, reports value of its research and development contracts has risen to a new record high of $21 million from about $12 million at the start of 1951.

Current backlog of work to be done amounts to more than $12 million, also the highest in the laboratory's history. Backlog at the start of the year was about $2,750,000. Employment has increased to 760 from 589.

"Demands for laboratory services have steadily increased since before the outbreak of war in Korea," declared Dr. Theodore P. Wright, president of the laboratory and vice president of Cornell University. "Next year's work is expected to eclipse all previous records. In order to cope with this situation, additional personnel, technical equipment and working capital are being provided."

Dr. Wright said that although subcontracting is extremely difficult in research and development work, the laboratory expects to subcontract to the extent of $1 million during the current year.

Never mind, Minnie, it'll hold...



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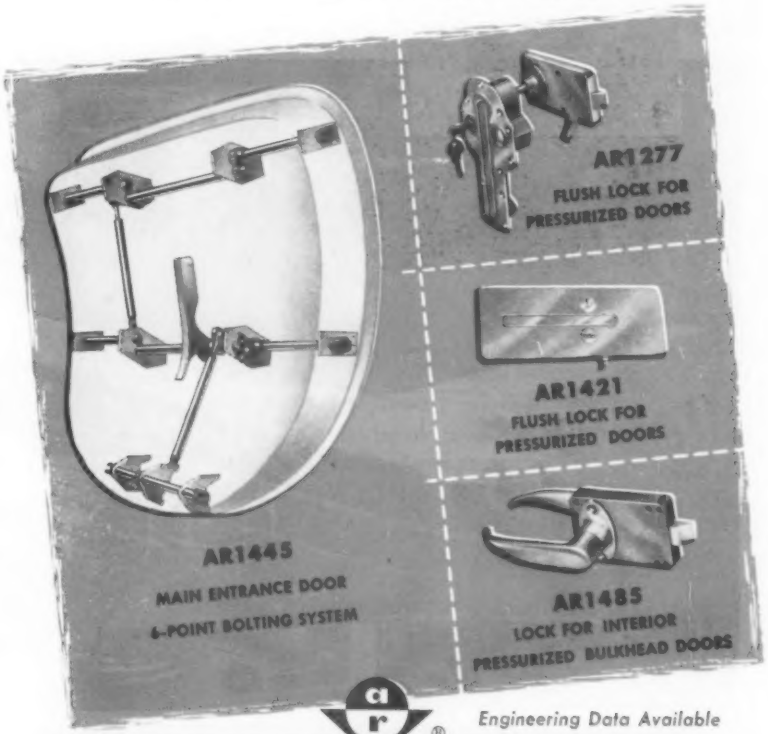

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THE BOEING "STRATOFREIGHTER" and its counterpart in commercial service, the "Stratocruiser", are powered by four Pratt & Whitney Aircraft R-4360 engines.

Thompson Products' latest contribution to this great engine—and to the aviation industry—is a brand new valve made from TPM alloy, the only new development in aircraft valve material in 15 years.

This new material is definitely superior to any other. Developed by Thompson Products, in cooperation with the International Nickel Company, it combines excellent corrosion resistance with high temperature strength.

The use of TPM, combined with sodium cooling and a new alloy on the valve head and face, also developed by Thompson, has contributed greatly to aircraft engine reliability.

Another Thompson first in the highly specialized field of aircraft valve engineering.

Boeing C-97A "Stratofreighter" —Trans-Pacific Cargo. Military Air Transport Service, USAF.

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NACA Reports

(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to Division of Research Information, NACA, 1724 F St., N. W., Washington 25, D. C.)

▸Effect of Horizontal-Tail Location on Low-Speed Static Longitudinal Stability and Damping in Pitch of a Model Having 45-Deg. Sweptback Wing and Tail Surfaces (TN 2381)—By Jacob H. Lichtenstein.

▸Effect of Horizontal-Tail Size and Tail Length on Low-Speed Static Longitudinal Stability and Damping in Pitch of a Model Having 45-Deg. Sweptback Wing and Tail Surfaces (TN 2382)—By Jacob H. Lichtenstein.

These two successive technical notes report on one series of investigations conducted by the NACA and dealing with low-speed stability. Models with interchangeable parts are used in the tests, which are aimed at determining the effects of components other than wings. Wings, of course, have been the subject of considerable previous investigation.

The first note concludes that changes in the vertical location of the horizontal tail have no significant effect on the rotary damping in pitch, but have significant effect on static longitudinal stability for low angles of attack.

For high angles of attack, stability improves with low location of the horizontal tail; but rotary damping in pitch increases for high locations.

Standard methods for calculating the tail contribution to damping in pitch were found reliable for all tail locations which were considered at low angles of attack.

The second note says that the horizontal tail contribution is in agreement with analysis. This shows that tail contribution to stability is related directly to tail size and length; contribution to damping in pitch is related directly to tail size and the square of the tail length.

▸Vaporization Rates and Heat-Transfer Coefficients for Pure Liquid Drops (TN 2368)—By Robert D. Ingebo.

Combustor design requires a knowledge of vaporization rates of liquids. This particular investigation used nine liquids in a series of tests to find these rates. Results were correlated to give an empirical expression for a heat-transfer coefficient which, when used in the heat-balance expression gave a final equation for vaporization rate.

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Quick detection of engine fires is assured on the new Martin 4-0-4, latest of the country's leading aircraft to be equipped with EDISON Fire Detection. Glenn L. Martin's engineers chose the EDISON System because of its long record of satisfactory service on practically every major airline. Flight engineers and maintenance men attest to the dependability, false-alarm-proof design, low maintenance cost and "split-second" warning action of EDISON detectors.

The highly successful thermocouple-type system was first developed in the EDISON Central Research Laboratories. This kind of research and development is going steadily forward. Announcement of new and better products for the aviation industry may be expected soon from EDISON.

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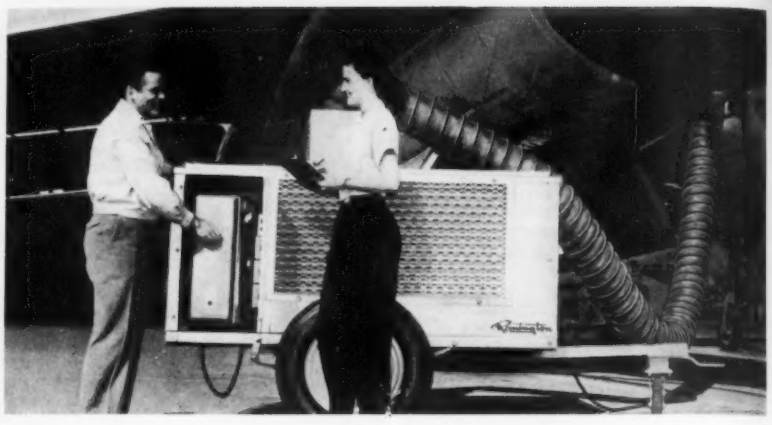


Remington Keeps a Hot Plane Cool

A mobile air-conditioner was used late last summer to maintain a comfortable working temperature in B-47s parked on Boeing Airplane Co.'s Wichita division ramp.

Prompting the acquisition of this unit were temperatures as high as 130F recorded in the plane's interior as final assembly touches were applied; and also the inconvenience caused the warm-suited engineering test pilot who sat in a B-47's cockpit during preparations prior to the takeoff run.

Boeing has ordered 12 of the conditioners from Remington Corp.'s air conditioning division. The electrically driven cooler is mounted on a ¾-ton trailer chassis and under normal operating conditions has a cooling power of 39,000 Btu./hr. A "schnorkel" projects from the top of the unit and houses a retractable 25-ft. duct that connects with the space to be cooled.

Another cooling and ventilating unit was developed for Link Aviation for use with pilot trainers.

Air Force Awards

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aro Equipment Corp., Bryan, Ohio, type D-1 oxygen reg., automatic diluter demand; pressure breathing maint. data, engr. data, 600 ea., $201,820.

Baer Mfg. Co., 2016 Fifth Ave., Rock Island, Ill., frame straightening machine, heavy duty, universal, $38,533.

Barrett Equipment Co., 2101 Cass Ave., St. Louis, grinders-brakeshoe, 24-in. capacity, 61 ea., $26,363.

Bell Aircraft Corp., Niagara Falls, N. Y., maintenance data and increase of Item 2 in contract, $42,277.

Boeing Airplane Co., Seattle, kits, spare parts for kits for B-47 aircraft, to be ordered by calls, exceeds $250,000.

Bonell Machine & Tool Co., Walter E. Schott Co., 1600 E. 24th Street, Cleveland, stand assembly—aircraft propeller, 63 ea., $79,380.

Canadian Commercial Corp., 1746 Massachusetts Ave., Washington, D. C., survey, radio transmitters, 190 ea., exceeds $250,000.

Consolidated-Vultee Aircraft Corp., Fort Worth, spare parts B-36, XC-99, series aircraft, exceeds $250,000.

DeLuxe Laboratories, Inc., 850 10th Ave., New York, 16mm release prints, $55,000.

Douglas Aircraft Co., Inc., Santa Monica, spares, data, kits for C-54, C-47 aircraft, exceeds $250,000.

Dow Corning Corp., Midland, Mich., development of a silicone or modified silicone resin foamed-in-place core material for sandwich construction, $37,551.

Flight Refueling, Inc., Danbury, Conn., increase to open contract for procurement of drogue reel units, S/P, and data, exceeds $250,000.

General Electric Co., 1 River Road, Schenectady, N. Y., technical data, 25 books ea., $67,568; spare parts for supply requests for turbosuperchargers and turbosupercharger regulators, $150,000.

The B. F. Goodrich Co., Akron, de-icer shoes for B-25, B-17 and B-29 aircraft, exceeds $250,000.

Gunlach Mfg. Corp., Fairport, N. Y., camera, still picture, spare parts, engr. data and maintenance data, 185 ea., $69,823.

Hobart Brothers Co., Troy, O., generator set, self-propelled, Hobart Model 871, 10 ea., $54,500.

Kindred Aviation Corp., 4015 Magnolia Blvd., Burbank, Calif., T-6 propeller assemblies, 30 ea., $25,500.

Landis Tool Co., Waynesboro, Pa., lathes and grinders, exceeds $250,000.

Machine Products Co., Inc., 1401 Fairfax Trafficway, Kansas City 15, Kans., maint., utility and plant protection services at GFP depot, $166,554.

Minneapolis-Honeywell Regulator Co., Minneapolis, spare parts, $81,910.

North American Aviation, Inc., Los Angeles, revision of prices, exceeds $250,000.

Radioplane Co., Van Nuys, Calif., modify 6 XG-1 targets and install turbo jet engines, 6 ea., $95,215.

Sperry Gyroscope Co., Sperry Corp., Great Neck, L. I., N. Y., components of the J-2 compass system, exceeds $250,000.

Switlik Parachute Co., Inc., Lalor & Hancock Sts., Trenton 7, N. J., parachute—personnel—seat 28 ft., bill of material, 200 ea., 2 ea., $72,636.

Tempco Products Inc., Bedford, Ohio, brake drum lathe, 9 ea., $25,506.

Thompson Products, Inc., 23555 Euclid Avenue, Cleveland, fuel booster pumps for B-45 aircraft, 400 ea., $150,000.

Thompson Products, Ltd., Ontario, Canada, machinery and equipment (facilities), exceeds $250,000.

The Tumpane Co., Government Aircraft Plant, No. 6, Marietta, Ga., record, inspect, ship, store and maintain machine tools, Am. #1 to Call 52-1, exceeds $250,000.

Tumpane Co., Inc., government aircraft, Plant No. 1, Omaha, record, inspect, ship, store and maintain machine tools Am. #1 to Call 52-1, exceeds $250,000.

PRODUCTION BRIEFING

▸**CIO-UAW** union members who recently went back to work at Douglas' Long Beach plant are insisting on progressive pay increases so that all workers can ultimately reach the top-level scale. Retroactive pay is also demanded and shop stewards want right to unlimited leave of absence. Long Beach facility now employs total of about 13,000; Santa Monica, about 15,000; and El Segundo, about 12,000. At Douglas' Tulsa operation for manufacture of Boeing B-47, about 2,000 are now employed—a figure that should climb to 10,000 within a year. Last war, women employes hit about 9%, and has already climbed to about 24%.

▸**Bell Aircraft Corp.'s** Helicopter division expects to have rotary-wing aircraft coming out of its new $3-million plant near Dallas early next year, is busy recruiting 2,000 employees there.

▸**Camloc Fastener Corp.,** has broken ground for a 27,000-sq. ft. Air Force-sponsored plant to increase production of quick-operating snap fasteners. Company plans to move its New York City quarters (202 W. 44th St. and 420 Lexington Ave.) to the new site when it is completed.

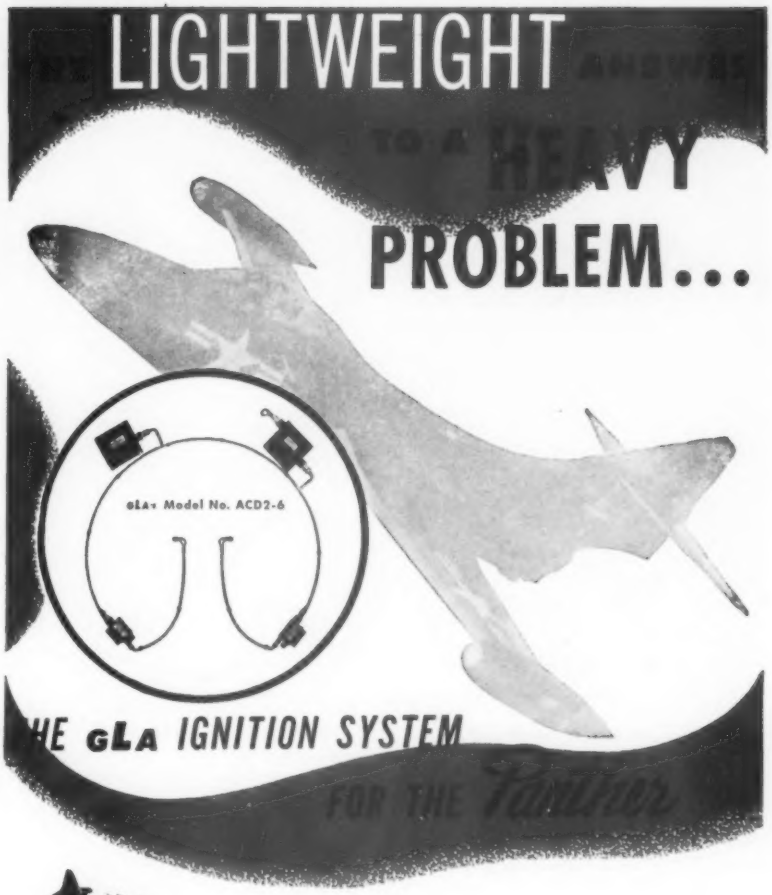
▸**Douglas Aircraft Co.'s** El Segundo division is adding a 190,000-sq. ft. extension to its manufacturing building, to lengthen its production line by 406 ft. By late next year, 1-million sq. ft. expansion of facilities will give El Segundo a building area of 2.6 million sq. ft.

▸**Greer Hydraulics, Inc.,** Brooklyn, N. Y., has increased its office and plant space to over 140,000 sq. ft., with over 15,000 sq. ft. added to its machine shop. The company has been reorganized into four divisions: aviation, industrial, special products, and research and development.

▸**Lockheed Aircraft Service-International** has opened a 4,200-sq. ft. supercharger and cabin heater overhaul shop in Queens, N. Y., near its N. Y. International Airport maintenance base.

▸**Patushin Aviation Corp.,** Los Angeles, is building a plant at 12839 Chadron, Hawthorne, for subcontracting aircraft components.

▸**Sprague Electric Co.,** North Adams, Mass., has opened an application engineering office at 3 E. Second St., Dayton, to provide more effective contact with midwestern government research and development laboratories.



On the Grumman F9F, ounces count; that's why you'll find the lightweight GLA *high energy condenser discharge system* doing a real heavyweight job! The Model ACD2-6 system for the Panther incorporates reliable performance from advanced electronic development with the latest weight and space saving design. Engineering and building this component for the Pratt & Whitney Nene jet engine is another example of GLA's leadership in solving the complex problems of electronic design involved in jet and supersonic aircraft.

An experienced technical staff with production facilities invites your inquiry. Write today.

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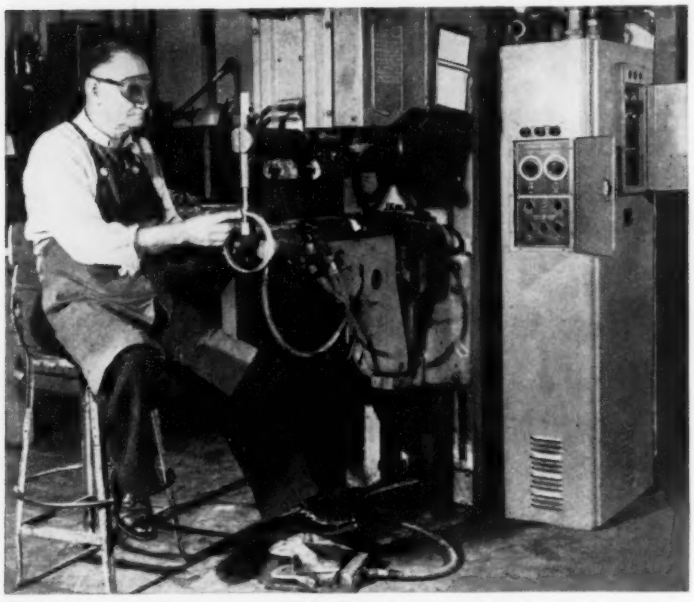
Solar Aircraft Welds Close to the Edge



Material does not split out, spattering is reduced on this jet engine part because G-E slope control permits a gradual increase in welding current that also reduces tip pick-up and spatter. More welds can be made before electrodes must be cleaned. Welds are sound and uniform. Bulletin GEC-534.

G-E Slope Control for Resistance Welding Prevents Split-outs on Stainless Steel Jet Engine Parts

More precise work possible with this resistance welding accessory used with G-E synchronous control.

Solar Aircraft, like many other plants working on jet engines, has found G-E synchronous control, with slope control added, will enable operators to work to closer tolerances, produce faster, with fewer rejects. The part shown is welded close to the edge but does not split out, and spatter is reduced on both stainless and mild steel.

Use G-E Synchronous Control wherever AN-W-30 and 32 specifications must be met. It assures consistently uniform high quality welds—operates quietly, requires little maintenance. Like all G-E electronic equipment, it has long life, is enclosed in a compact unit that may be mounted on the welding machine or wherever convenient. Easily inspected. Write today for Bulletin GEA-4699. *General Electric Company, Schenectady, N. Y.*

Be sure of consistent, high-quality welds with these G-E Accessories

DETERMINE THE BEST TIMING FOR A JOB **Portable, inkless G-E cycle recorder makes a record of the exact timing on test welds, is then used as a check to verify the setting on machines in production. Bulletin GEC-376.**

HOLD WELDING CURRENT CONSTANT **Regardless of line-voltage variations of as much as plus 10 per cent and minus 20 per cent, the G-E electronic voltage-regulating compensator holds welding current constant. Bulletin GEA-4223.**

REDUCE BRITTLENESS **Heat treat medium-carbon, low-alloy, or high-alloy steel with G-E tempering control. Easily installed and operated. Adjustable to suit thickness and type of metal welded. Bulletin GEA-4201.**

MEASURE ELECTRODE FORCE **Check existing gages on spot, seam, or projection welders or at time of set up. Easy to use, saves time, acts as a production check. Force range: 0 to 4500 pounds. Small, portable. Bulletin GEA-36288.**

PREVENT CURRENT VARIATIONS **Where the insertion of magnetic material in the throat of the welding machine causes weld variations, the current-regulating compensator keeps current constant to within plus or minus two percent. Bulletin GEA-4207.**

GENERAL ELECTRIC

645-54

FLOODED FIELD at TWA's Kansas City base put the airline to a test which had no precedent.

How TWA Beat Disaster at Overhaul Base

By working around the clock, crews saved equipment, airline maintained 85.1% of schedules during flood.

By George L. Christian

Kansas City, Mo.—Trans World Airlines is the first major airline in aviation to have had its main overhaul and maintenance base put entirely out of commission for an extended period of time.

Yet, it kept its engine and plane overhaul work on schedule at improvised bases more than a thousand miles from its flooded worldwide overhaul center.

▶**Black Friday**—The Kansas City flood, striking on Friday the 13th (of July) inundated the airline's overhaul center at Fairfax Airport, Kansas City, Kan., across the muddy Missouri River from Kansas City, Mo., Municipal Airport, where TWA has its system operations offices.

Both airports were surrounded by the mounting flood waters, but responsible authorities did not consider them in danger. Fairfax Airport was inundated when dikes failed under the water's pressure. Municipal Airport was completely evacuated, but escaped the muddy deluge.

In spite of the disaster to its overhaul base, TWA was able to keep schedules up to 85.1% of normal during the hectic first nine days while Fairfax Airport was under water. Overhaul work at this location was resumed on a limited scale 17 days after the waters receded. By that time TWA had upped its schedules to 87.9% of normal. Three weeks later they had been pushed up to 90%.

▶**First Call**—At 4:15 pm., July 13, a message flashed from a plane making an aerial survey of the rising Missouri and Kaw Rivers: "Evacuate Municipal Airport." This terse statement alerted such departments as engineering, operations, line maintenance and medical, in TWA's operations building on the airport.

In the survey plane, John A. Collings, executive vice president, Frank E. Busch, general operations manager, and R. M. Dunn, director-engineering and maintenance, had reached that drastic decision. No official word to evacuate had yet been received from military or municipal sources.

Word was then telephoned to the overhaul base to "begin getting things ready to evacuate—just in case." Four hours later, about 8 p.m. that night, sand boils began to develop behind the dikes surrounding Fairfax Airport. Employes on duty there were advised and a guard system was established to warn them in case the water began coming in at an alarming rate.

While some employes worked on aircraft to ready them for the transfer to higher ground, others boxed up precious and expensive equipment to place them aboard the planes as they were flown out. It was estimated that more than $1 million in equipment was placed aboard five aircraft rushed to completion that night.

Exactly 16 hours after word had been flashed from the survey plane, a fire truck laden with men clutching boxes of spare parts and supplies, wallowed through 18 inches of water to escape from the overhaul base where the flood soon reached depths up to 12 feet. Meanwhile, Municipal Airport had been evacuated before midnight.

▶**Impromptu Plan**—When the 4:15 message to evacuate hit the base, it had been working under the calm assurance that the dikes would hold and that all was snug and safe. Things happened fast.

Maintenance tools, such as rivet guns and electric drills, were loaded into every available truck and taken from Municipal Airport to Grandview, TWA's emergency headquarters located 20 miles southeast of Municipal Airport.

Two DC-3s were pressed into service, loaded with a variety of equipment from Municipal Airport and personnel using them shuttled to and from Grandview.

At Fairfax Airport men swarmed over aircraft in various states of undress to reassemble them to flyable condition. Starting with the easiest to complete, the crews were able to get five of 11 aircraft into the air before water closed the airport.

Example of the catch-as-catch-can improvising that had to be done to get airplanes out of the flood's reach was a Constellation, last plane readied to be flown out. As flood waters marched into the south end of the field, it was discovered that no fuel was available because the fuel pump motor was broken. An air bottle was hooked up

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To set up and supervise methods group. Aircraft background essential.

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To supervise Estimators in Aircraft Projects.

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Extensive Aircraft Experience Required.

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to the motor and it ran sufficiently well to get gas into the ship for the short flight to Grandview.

At daylight, July 14th, Busch offered to fly in a planeload of men, police having in the meanwhile closed all roads leading into the flooded area. But time was running out and the base was abandoned to the rampaging rivers at 8:10 that morning.

▶ **Unprecedented Problem**—When salvage work was no longer possible, Dunn turned his efforts to reorganizing his staff to cope with the disaster.

Three emergency organizations were created.

• **Outside Agency Overhaul.** Obviously TWA was going to have to ship out many of the components normally overhauled in its own shops to outside agencies. This detail was given to A. E. Smick, manager, engineering.

• **Line Maintenance Coordination.** Much of the maintenance usually performed at Kansas City was now transferred to the carrier's principal line stations. Los Angeles, Chicago, New York, for example, all were supplied with additional mechanics to absorb the increased burden thrown on their shoulders. This activity was directed by E. T. Huff, Manager, line maintenance.

• **Base Rehabilitation.** Fred Humphrey, in charge of this activity, went to work to have the necessary manpower and equipment organized and ready to move at a moment's notice as soon as the waters had receded sufficiently. He and Dunn made several inspection trips in a rowboat, specially equipped with wooden oar locks and other safety devices to counter the enormous fire hazard created by thousands of gallons of gasoline and oil spilled on the flooded waters. At the flood's crest, the men could step out of the boat into the second story offices.

All other sections of Dunn's staff ceased to function and devoted their efforts to assisting these three organizations.

▶ **Plan in Action**—Two hours after the flood waters had sloshed into the base, emergency procedures were being created and carried out. Operations, reservations, and other departments from Municipal Airport were literally superimposed on accounting and treasury departments, located in a downtown office building.

One tremendous hurdle was keeping intact the reservations system, which scarcely missed a beat even though the whole department, under leadership of Robert McCormick, manager, virtually mushroomed uptown from a group of desks and emergency long-distance phone circuits to New York, Chicago, Philadelphia, Los Angeles and San Francisco. These circuits remained open for two days with personnel manning them around the clock to keep the reservations system clicking.

▶ **New Supplies**—The week of July 15 was spent in frantically buying materials, supplies and equipment to replace those lost or damaged. Fred G. Betts, purchasing director, and James A. Shaunty, stores director, formed a team to get the job done. Paper work was dispensed with.

Not since formative days of the airline had purchases been made without business-like paper work to keep a record of the purchases. It was a precedent but one that had to be set to keep the airline going. For example, all commissary items had been wiped out. Within 48 hours Betts and his staff had placed orders with vendors to replace lost items.

Shaunty and his key men set up procedures to dispatch parts to stations throughout the domestic system. The overhaul base is also the nerve center for all stores stocks and a complete check had to be made of all known "active" replacement parts and supplies. Reorders were made as fast as they could be written out. Instead of the supplies flowing into Kansas City to be placed into stock, they were sent to strategic points along the TWA network of domestic routes. R. I. Reynard, provisioning manager, and his staff, were credited by Shaunty with keeping the parts moving to stations where they were needed.

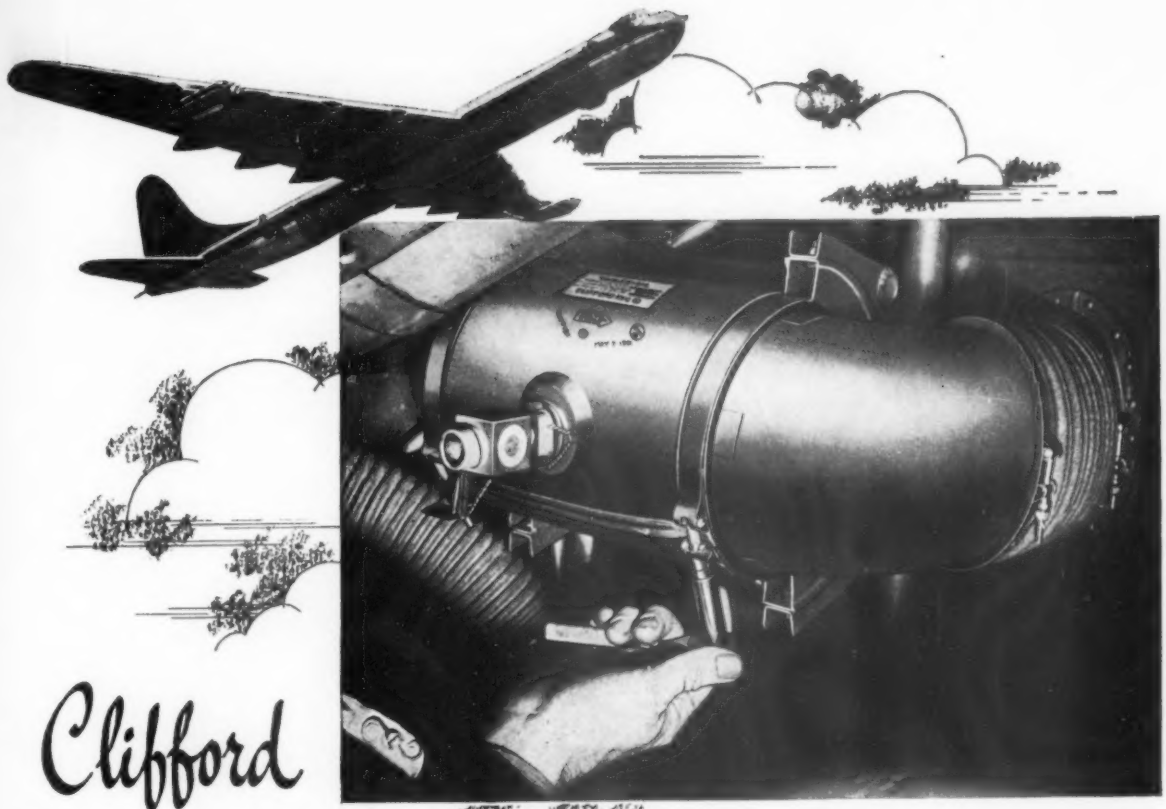
Propellers were sent from Los Angeles to New York for repair, then returned to Los Angeles again. This was an example of the round-about procedure typical of getting the job done under the emergency created by the flood.

▶ **King-Size Cleanup**—On July 22, the first crew of 300 men sloshed into the base to begin the job of rehabilitation. Under the guidance of Fred A. Humphrey, assistant to the director of engineering and maintenance, the job rapidly took shape.

The men set up gasoline-powered generators, lights, steam jennys, a screen-enclosed outdoors room for eating, a first aid station where employes were urged to avail themselves of typhoid and tetanus shots. Aircraft chemical toilets were pressed into service. Clean-up benches were set up.

Difficulties of the rehabilitation program were compounded by the fact that sewage had contaminated the flood waters, and oil and gasoline from nearby refineries, also flooded out, gave additional stench and grime and hazard to the ravaged overhaul facility.

▶ **Booby Traps & Slime**—During the first two days, much time was consumed cleaning up the ankle-deep slime that covered the base, and removing innumerable booby traps. The latter, consisting of such odds and ends as barrels



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in rafters, constituted hazards to the main body of workmen when they were able to report for work.

By July 24, the clean-up crew had whipped the base into such shape that TWA was able to put 1,200 men to work on a round-the-clock schedule.

Humphrey said that employe morale was high. Skills and crafts were forgotten, nobody bothered to ask what to do but pitched in with a will on the first job at hand, no matter how dirty or objectionable.

By July 30, the facility was in good enough shape to commence work on the six aircraft that had been left behind.

Organized cleaning was completed by Aug. 25, when maintenance was resumed on as full a scale as possible.

▶**From the Studding Out**—TWA's base consists of many individual office buildings. Most of these, including the engineering building, cafeteria, purchasing and cost accounting, and plant maintenance shops had to have the first floors rebuilt from the studding out. All electrical cables, connections and outlets and phone wiring had to be replaced from scratch. Also much of the plumbing, heating and air conditioning facilities.

These statistics give a measure of the vastness of the company's rehabilitation:

• **Areas cleaned**—Apron, parking and floor areas, 1,392,304 sq. ft.; wall areas, 307,080 sq. ft. **Total, 1,699,384 sq. ft.**

• **Rehabilitation cost**—carpentry, $250,000; electrical, $150,000; plumbing, $24,500; air conditioning, flooring, painting & miscellaneous, $59,900. **Total, $484,400.**

Estimated completion date of clean-up and rehabilitation is Jan. 1, 1952.

Figures on number of parts salvaged were not available. But TWA estimates that over 50,000 different types of parts had to be cleaned, and that the actual number is astronomical. Some units had to be cleaned and inspected six times and still undergo a final inspection prior to installation on a plane.

▶**Shops First**—On a recent tour of the base, this reporter saw, among other things, the shambles of the engineering building's ground floor. All partitions were out, wiring hung indiscriminately from studding and ceiling like drying spaghetti. The staircase was gone. Access to the bee-hive-busy upper floor was by outside stairs.

Surveying the damage, Dunn told AVIATION WEEK that the major post-flood effort had been directed to getting the overhaul shops back into operation. Offices were given second priority. For example, work did not even start on Dunn's headquarters, the engineering offices, until the overhaul shops were up to pre-flood production.

▶**Beau Geste**—Rarely has the traditional mutual assistance among airlines been so clearly delineated as during TWA's trial by water. Telegrams and cables started pouring into Collings' office from every part of the country with offers of assistance. The offers ran the whole gamut of airline operation. Some proffered aircraft engines, some parts and supplies, others facilities for TWA to perform its own overhaul.

New Methods Double Pump Life

Detroit conference also hears details of other new air transport hydraulic developments.

By Scott H. Reiniger

Detroit—Piston-type hydraulic pumps produced by Vickers, Inc., now last twice as long and are overhauled half as often as their World War II counterparts, company engineers told AVIATION WEEK at the recent Air Transport Hydraulic Conference held here.

▶**Long-Lived Pumps**—Ultimate life of pumps, they said, generally has been extended from about 7,000 to 14,000 hr. before major replacement of subassemblies; overhaul life (usually seal change) from a maximum of 800 hr. to a maximum of 1,500 hr.

Some airlines are raising this still further by disassembling pumps only at every other overhaul period, and bench testing them between times.

On display at the meeting was a disassembled PF17-3911-25ZE Vickers pump which had seen 13,000 hr. service in a Capital Airlines plane. The pump had been tested at 1,200-hr. intervals, overhauled (seals changed) at 2,400-hr. periods. Only part replaced was a universal link, at about 7,000 hr. Allowable leakage for wear of the pump was far below that permitted. A Capital Airlines representative said this unit by no means set a record in service.

▶**Credit Lines**—Vickers credits improved performance since World War II primarily to elimination of stamped steel bearings (burrs on rings formerly chipped off into operating parts), increased thickness of cylinder walls, larger bearings and generally more rugged construction to prevent early failure from shock loads. These improvements entailed a weight increase

(This is the second and concluding article on the Air Transport Hydraulic Conference.)

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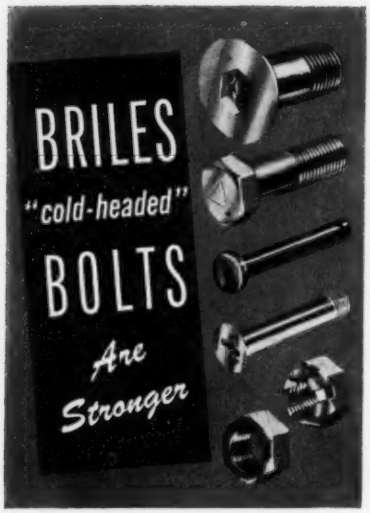

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which Vickers is trying to trim off.

A factor cutting repair costs is that small parts in pump subassemblies can be removed more readily and replaced, without involving the entire group.

▶ **New Valve Plate**—This improved performance doesn't take into account the effect of a new valve plate recently added to pumps which smooths out pump delivery, reducing pulsation, surge and noise. It was only at the Detroit meeting that early, first-year reports on this modification started rolling in from airlines.

Generally, airlines indicated they were highly satisfied with the new valve plate. Since its development, Vickers feels in many cases it now can recommend overhaul at 5,000-hr. intervals with periodic bench testing. This compares with the Capital Airlines pump mentioned before, which was overhauled at 2,400-hr. periods and bench tested at 1,200-hr. intervals. This pump had no valve plate.

Airlines have added the valve plate to pumps in service by means of "wafer" kits distributed by Vickers. All pump models released in the past two years include the plate as an integral part, the firm said.

The modification has cut overhaul expenses to ⅓ of what they were and increased reliability of pumps six-fold, a study at Northeast Airlines showed. Other airline reports indicated surge has been reduced 50%, pulsation 25% and noise 96% (Vickers estimate).

An Eastern Air Lines spokesman said crews found pump noise much reduced in flight tests of the unit in a DC-4. Eastern expressed the view that many vibration troubles encountered in the hydraulic system proper, such as in tubing, etc., would be considerably reduced as a result of the valve plate.

▶ **Piston-Gear Comparison**—Test results reported at the meeting by Convair, Martin and Lockheed revealed there was no significant difference in pulsation between various types of piston and gear pumps tested.

While the meeting indicated freedom of pulsation no longer is a major advantage of gear over piston-type pumps (and though airline representatives told AVIATION WEEK, "You can't beat Vickers pumps for reliability and performance"), some companies are specifying gear pumps in new planes. Gear pumps cost less and do the job adequately, they say.

A Douglas spokesman told the group that after elimination of some early troubles, his company was having favorable experience with a Pesco gear pump. Martin 4-O-4s and Convair 340s will be equipped with them, representatives pointed out. Until recently, airlines have used piston pumps almost exclusively in 3,000-psi. systems. The Air Force uses both.

One pump expert explained: "In early low pressure systems (and even now), gear pumps were 10 yards ahead of piston pumps. Now in 3,000-psi. systems, piston pumps are 10 yards ahead of gear pumps." He thought the higher the system pressure, the greater are the chances of piston pumps being used.

▶ **Vickers View**—Vickers believes that while piston units have a higher initial cost, this is more than offset by lower running costs.

Advantages listed by the firm: Higher volumetric efficiency, cooler operation, lower weight and greater reliability. Efficiency of gear pumps drops off at lower speeds, Vickers says. While there are fixed- and variable-displacement piston pumps on the market, only fixed-displacement gear pumps are available presently.

Capital Airlines selected a 3,000-psi. piston pump for the 1,200-psi. hydraulic system in the Super DC-3, on the basis that the Vickers unit would cost less to operate than a gear pump of lower pressure rating.

Capital's figures break down like this:

- Cost of overhauling and testing 3,000-psi. Vickers pump—$4.99.
- Cost of overhauling gear pump designed to operate generally at 900 psi. —$5.14.

Early failure of shaft seals was the major complaint on Vickers pumps. This occurs most frequently, the meeting developed, in the Constellation where engine heat breaks down the seal. But Vickers told the group the problem had been licked with development of a new seal element which already has been successfully tested by one Connie operator.

▶ **Routine Troubles**—Otherwise, troubles seemed to be of a routine nature—nothing the airlines couldn't live with—including a normal incidence of unscheduled removals because of bearing failures and shearing of coupling shafts.

Vickers promised, at airline request, to look into the possibility of providing more clearance for retaining nuts on the pump housing. Mechanics now have to use special wrenches, trimmed down, to get these off. The company also described a modification now in effect to prevent improper insertion of a retaining pin in the pump. Operators complained the pin often was bent.

The possibility of standardizing on a single pump for all Constellation series planes was explored. Lockheed did not think it practical. Eastern and others disagreed. The matter was deferred for further study.

▶ **Large Pump**—KLM had good service reports to give on the PV-3918 variable displacement pump—largest aircraft unit of its type in use. This unit, with an output of 2.34 cu. in./rev., has been specified by the Navy for driving elec-

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trical alternators and hoisting gear mechanisms in anti-submarine blimps. It was designed originally to simplify hydraulic drive circuits for cabin supercharger compressors.

Three pumps in tandem now used deliver less than the new pump does alone. This complication is one of several reasons operators have tended toward engine-driven compressors.

But engines are overloaded, so simplification afforded by the big pump may shift the emphasis to hydraulically-driven compressors, it was the opinion of some airline and airframe manufacturing representatives.

Tubing

Tubing is in a state of flux, the meeting revealed, with opinions varying as to what type or types are best suited for aircraft hydraulics.

One frustrated delegate at the meeting put it this way: "We are told here stainless steel tubing fails at the bends and can't be used. Before, it was 24ST aluminum alloy—but that was no good. Then we hear 61ST is good, then it isn't. Now we are back where we started—with 24ST again. Everdur is supposed to be the solution, but it can be used for special purposes only. Where do we go from here?"

▶**Help Coming**—But it really isn't that bad. Airlines are getting more help from tubing manufacturers in solving their problems. This is being stimulated by increasing competition between aluminum tube makers and companies producing steel and other types of tubing for aircraft.

Experience of some operators indicates many tubing troubles can be avoided by better quality control and more careful handling all down the line, from factory to user. United Air Lines told the group, tubing is subjected to rigid piece-by-piece inspection on arrival and handled with kid-glove care. Lockheed said it uses the spot-check method.

Fittings for flared-end tubing still are in a strong position, but Ermetto-type fittings for straight-end tubing, after recent improvements, will make headway again, some engineers believe.

Eastern Air Lines reported ¼-in. aluminum-alloy SO and ST tubing had repeatedly failed in the Constellation—occurring always at the flare. EAL has replaced the majority of these with Everdur copper tubing and so far has had no trouble, it said. The carrier also is using Everdur in place of aluminum alloy and stainless steel lines in areas vitally affecting safe operation of the plane, particularly in landing gear extension systems. One drawback—it weighs more.

Some views on tubing:

• **52SO aluminum-alloy** tubing in smaller sizes is no good for flaring because it extrudes under tightening.

• **Stainless steel** tubing flexes at flattened bends like a Bourdon tube, causing failure.

• **24ST aluminum-alloy** tubing is hard to bend and especially hard to flare. It is quite possible that flares with incipient cracks may be installed, despite rigid inspection.

Accumulators

"Hourglassing" of bladders in Bendix type accumulators (distortion of bladder into hourglass shape) causes the ports to be blocked off, British Overseas Airways reported. Lockheed said it not only had experienced inadvertent closure in these units, but rupture of the bladder as well. Vickers noted this was unlikely to happen in diaphragm accumulators of the type it produces.

▶**Cylindrical Type**—The Air Force and Navy pointed out they are going away from bladder and diaphragm type accumulators to cylindrical piston-type units. Glenn L. Martin called these the ultimate solution, while noting there were many "bugs" yet to be overcome. The military favors the wider temperature operating range of the cylindrical accumulator.

Vickers pointed out there presently is a weight sacrifice in using these and is working on development of a diaphragm accumulator that will match them in low temperature performance.

Filters

Lockheed advised Connie operators against installing filters downstream from pumps to prevent metal chips from entering the balance of the system. It said the weight penalty would be too great and little would be achieved by the modification. Tests indicated only 15% of the chips went through the pump discharge line anyway while 85% pass through the case drain line. Eastern said it would be more to the point to put a filter here. Eastern's present procedure is to cut the pump out of the system by means of a SIL-134A type by-pass system when failure is indicated and clean the case drains.

Air France told the group it is planning to use the SIL-134A pump by-pass for its Connies. Lockheed said tests indicate a new control valve to be used in the 1049 Super Connies does just as good a job as the by-pass system used by Eastern.

▶**Conference Details**—Chairman of the meeting was Robert R. Stark, assistant to the vice-president in charge of engineering at Eastern Airlines. Conference details and agenda were handled by Walter Flinn, Vickers airline sales engineer.

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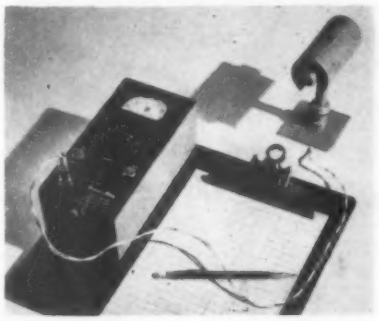

Flight Research Tool

A sensitive temperature indicator, designed for flight studies, has been developed by Beckman & Whitley, Inc.

The set consists essentially of a thermistor for mounting on the wingtip and an indicator-control unit mounted on a data-recording clipboard. This is used by the researcher in the cockpit or cabin.

The equipment, says the developer, permits data on temperature differentials with altitude to be rapidly secured. Also, boundaries between various air masses can be located accurately in studies of synoptic meteorology. The set, Model 170-100, is accurate to ±0.2F over a range from 15F to 120F.

Beckman & Whitley, 906 San Carlos Ave., San Carlos, Calif.

Zinc Alloy Rivets

Low-cost zinc alloy rivets for low-stress applications and for areas where corrosion is a problem are being marketed by Gries Reproducer Corp.

Low price of the rivets and high uniformity to close tolerances has been achieved through exclusive die casting techniques, says the maker. The rivets are made in tubular and semi-tubular types, can be applied with hand tools or machine.

Produced with oval, flat or countersunk heads, rivets are available in diameter sizes from $\frac{1}{8}$ to $\frac{3}{8}$ in. and lengths up to $\frac{9}{16}$ in. Special tiny sizes can be supplied, the firm says.

Gries Reproducer Corp., 780 East 133 St., New York 54.

Rush to Coaches Opens New Travel Era

• CAB and IATA backing expands low fare services.

• Travelers, manufacturers, rails to feel effects.

The scheduled airlines of the world enter the new year in the mass transportation business—almost despite themselves.

Civil Aeronautics Board has taken the brakes off domestic coach service and practically urged the carriers to run coach service anywhere at any time, instead of only over selected routes at off-hours.

Members of the International Air Transport Assn. have agreed to start trans-Atlantic air coach service May 1. And because it is difficult for one international air route to operate independently of the other, IATA followed up with studies of where coach would fit into European services and routes elsewhere in the world.

In short, government and transport industry officials agree 1952 will be the year of air coach.

This is bound to create some deep and long-lasting effects on travel habits, surface transportation companies, the manufacturers of transport aircraft, and the airlines themselves.

• **Travelers** will find it really is cheaper to go by air on domestic routes when, if expectations are realized, air coach fare drops below 4 cents a mile. Trans-Atlantic travelers with limited budgets and limited vacation periods will find a two- or three-week vacation in Europe is actually possible.

• **Surface transportation companies** will feel air competition as never before. The new push to widen air coach services actually may bring air fares lower than rail coach. On Atlantic routes, air coach fares are almost certain to mean that for the first time more persons will cross the ocean by air than by sea (AVIATION WEEK Dec. 17, p. 14). The trans-Atlantic air coach fare should sharply cut into the steamship lines' first-class bookings.

• **Manufacturers** already are experiencing the greatest boom in commercial transport business in their history. American Airlines' order for 25 DC-7s (AVIATION WEEK Dec. 24, p. 17) may be only a starter. AA could, if it wished, modify its DC-6 and DC-6B fleets to coach planes. And TWA and United, competitors on the transcontinental run, must be giving great thought to expanding their own fleets.

Foreign operators, now forced into coach service, are contemplating with great uneasiness the small sizes of their fleets to handle the expected rush of coach business. And the only quick source for large new transport aircraft is the U. S.

• **The airlines** are eventually going to face four effects of the coach boom above all others: 1. More passengers than perhaps they ever have dreamed of with consequent worries about additional passenger-handling facilities; 2. Soaring expenses (which already are reducing net incomes) measured against perhaps an initial drop in gross, occasioned by more coach; fewer first-class fares; 3. A possible over-expansion, if coach promotion does not keep pace with increased seating capacity; 4. An eventual increase in first-class business as well as coach.

Persons who buy air coach tickets because they are cheap are excellent prospects later for first-class reservations, traffic men believe. As a traveler's income increases, so usually does his scale of living; he is in a position to move up from second-class air travel to first-class.

Here's the outlook as appraised unofficially by some CAB and ATA analysts for air coach prices on the main U. S. routes:

• **Transcontinental fares** will average about 4 cents a mile; American and TWA will charge an average $99, United $93.50.

• **West Coast fares** will stay at 3½ cents Los Angeles-San Francisco.

• **East Coast fares** will drop to 3½ cents as Eastern Air Lines meets the National Airlines $43 New York-Miami fare, and CAB approves it. Eastern has never been known to be under-priced long by a competitor on any route.

• **Local interior U. S. fares** may range from 4 to 4½ cents; coach routes are not so densely traveled nor are they so competitive as the West Coast, East Coast and transcontinental services. For example, a Capital Airlines spokesman says he doubts Capital will reduce coach fares from 4½ cents—mainly because none of its coach routes are directly competitive.

But on the high-density routes that account for most air coach traffic the fares will range from 3½ to 4 cents a mile.

Civil Aeronautics Board itself urges the airlines to cut coach fares generally: "The Board will encourage proposals by the certificated carriers. . . . To reduce fares charged for coach service below the present general minimum of 4½ cents per passenger mile." So it's possible that ultimately the coach fares will come down from 4½ cents also on the local, interior U. S. routes that are less competitive.

► **Will Hit Bus and Rail Coach**—Long-term effect of this air coach fare cut and service expansion can probably best be seen from what has already hap-

Air Fares vs. Rail Fares

	RAILROADS First-Class	SCHEDULED AIRLINES Regular Service	SCHEDULED AIRLINES Air Coach
1945	2.95 ¢/mi.	4.95 ¢/mi.	.....
1946	3.06	4.63	.....
1947	3.53	5.07	.....
1948	3.91	5.74	.....
1949	4.06	5.82	3.96 ¢/mi.
1950	4.17	5.76	4.10
1951	4.23[1]	5.78[2]	4.38[2]
1952	4.25[3]	5.78[4]	3.90[4]

[1] Figures for first eight months of year; include Interstate Commerce Commission-estimated 1-cent Pullman charge plus 3.23-cent basic fare. Rate for 1950 was .92-cent Pullman plus 3.25-cent basic fare.
[2] Figures for first six months of year.
[3] Estimate; assumes no 1952 fare increases. It is based on unofficial Association of American Railroads estimate of fare for last four months of 1951.
[4] Estimated unofficially by CBA Rates division and Air Transport Assn.

SOURCES: Civil Aeronautics Board, Interstate Commerce Commission, Association of American Railroads.

pened on the Los Angeles-San Francisco route. In 1948, before air coach came to that route air travel between the cities accounted for 28% of the total rail, bus and air travel.

In 1949, the first full year of regular coach service air's share of the LA-ASF traffic jumped to 43% of total rail, bus and air. Observers put the 1950 and 1951 figures at over 50% of all scheduled travel.

And that includes buses and rail coach.

▶**West Coast Pattern**—A CAB official points out that that Los Angeles-San Francisco is the ideal air coach market due to travel density, geography and weather. What happens there on fares and transport economics happens elsewhere in the country later, as bad weather operations are improved and the airlines gain more of the public acceptance they already have on the Pacific Coast.

New York-Miami travel already is proving this trend, as National Airlines files for a 3¼ cent fare—same as Los Angeles-San Francisco.

So the West Coast experience indicates that the new air coach trend will cut deeply into bus and rail coach business as well as first class rail.

And that's not all: The time saving of air travel, combined with the new money saving, will convince people to travel where they never traveled at all before—even by bus—because they didn't have the time. Best illustration of this is the expected impact of trans-Atlantic air coach next spring and summer.

▶**Overseas Vacation**—Roundtrip to London from New York used to cost $711 in the vacation season. Few could afford to make that. And few could go by boat, because most people get only a two-to-three-week vacation.

Now air coach at $486 roundtrip puts a vacation in Europe within reach of most Americans on both time and money.

So the 1952 air coach expansion and fare cut will not only carve a hunk out of bus and rail business, it will expand total travel considerably, CAB believes.

Cut Travel Red Tape, ICAO Group Says

(McGraw-Hill World News)

Buenos Aires—Elimination of red tape for passengers, baggage and airplane crews at international airports was recommended by the International Civil Aviation Organization's Facilitation Conference here this month.

The Conference drew up general recommendations designed to simplify international procedures down to the routine used in domestic service.

Detail paper work, such as examination of health and vaccination certificates, will be done aloft, instead of delaying passengers at airports, if the recommendations are adopted.

The antiquated system of presenting consular visas for goods and passenger manifests also would be eliminated.

The recommended procedures, the conference said, would result in savings to airlines and governments involved, and eventually would result in lower transportation costs.

Travelers were becoming so exasperated with running errands in connection with travel that Panagra initiated the custom here of relieving them of the inconvenience of getting their entry and exit visas. Other international airlines have done the same.

Insofar as possible, passport visas and particularly transit visas, would be eliminated under the ICAO agreement.

J. A. Paine, chairman of the Facilitation Committee of the International Air Transport Assn., commented on the security angle:

"Generally speaking, the visa system does much to disturb the traveling business man or tourist with burdensome formalities, while the persons governments want to catch get through anyway. Visas do little to protect security of a country, since agents usually have the best possible documents."

Paine noted that of the Latin countries, Argentina is taking the lead in air-mindedness, with a decree now pending which would facilitate smoother operation.

AIRPORT PARKING METER

Plane owners, pilots and airline passengers often make a practice of parking their cars at an airport while they are away on trips. And they usually park in the choice next-to-the-fence positions. Westchester County Airport, White Plains, N. Y., has solved the problem by installing 52 parking meters along the fence adjacent to the ramp. Manager Robert W. Gallaway estimates meters will pay for themselves in a year. Five cents allows 30 minutes parking.

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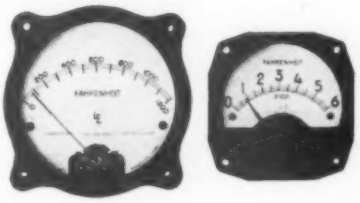

MODEL 23B, left above, has same type movement as our aircraft pyrometers. Housed in flanged, 4" round, bakelite case for panel mounting.

MODEL 20B, right above, has same 3" steel case and same movement as our aircraft panel indicators. Both are fully cold-end compensated and available in standard ranges listed, with suitable thermocouple materials.

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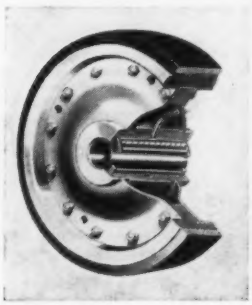


Tories Study Private Share in Civil Air

(McGraw-Hill World News)

London—Will private operators get a better break in Britain's state civil aviation monopoly?

In the House of Lords, Lord Leathers, chief Tory civil air spokesmen, recently promised he would try to find ways of doing just that.

At the same time the new Minister for the Coordination of Transport, Fuel, & Power warned that he had no intention of undermining BEA's and BOAC's existing international network. That seemed to limit the field for expansion by private operators to routes inside the British Isles and to charter work.

Over the next year, the Tories will make a detailed study of British civil aviation. No new policy will be announced before then. As preparation for this, Lord Leathers announced that all "associate agreements" between the government airlines and private operators which come up for renewal will not be given any extension beyond March, 1953.

Also left hanging was the fate of the Ministry of Civil Aviation. It is expected that the ministry will be merged with the Ministry of Transport under Transport Minister John Maclay. Lord Leathers assured the house that any merging at the top would not effect the "essential work" of MCA.

During the debate, Lord Balfour of Inchyre, championing the lot of the private operators, claimed that the Labor government's policy of "throttling the possibilities of expansion of independent operators," had reduced the effective British mercantile air fleet "to some 26 aircraft, none of them four-engined."

Lord Ogmore asked the government to take steps to allow civil aircraft builders to get more men and materials to take advantage of the ready market for Britain's new turboprop and jet transports. He lamented the fact that Britain could produce only one Comet a month "starting next spring" and one Viscount a month "starting next October." With the Comet costing over $1.4 million and the Viscount over $700,000, Lord Ogmore thought these very valuable export items.—**NMcK**

Aussies Flying More

(McGraw-Hill World News)

Melbourne—Australian airlines planes are flying 41 million miles a year, the department of civil aviation reports after compiling figures for the year ended March, 1951.

Route miles for the year increased 13% and actual miles flown were up 9.4% over last year. Passengers carried rose 12.9% to an all-time high of 1,689,069. Passenger load factor was up 2.1%, lowest of increases shown. Freight tonnage was up 20.7% and mail-ton miles increased 6.3%.

Overseas National Withdraws Coach Bid

Overseas National Airways, CAB-approved nonsked, has withdrawn its application for an East Coast non-subsidized air coach certificate. ONA President George W. Tompkins explained: "We feel that the Board has already prejudged our application in docket 5046 (the ONA application)."

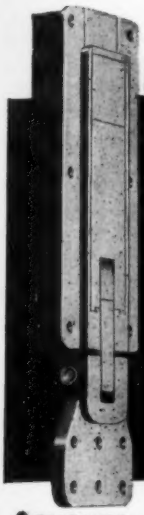
This is the second time ONA contends it has been forced by U.S. civil aeronautics authorities to cancel its plans. Overseas National is the operator that almost bought two British transport Comets from de Havilland for $3 million.

▶ **Reasons**—ONA finally had to let its option go, however, because it couldn't afford cost of U.S. certification of the plane by CAA (AVIATION WEEK Nov. 26, page 14). ONA had unsuccessfully asked CAA to accept the forthcoming British certification of the plane as safe.

Tompkins cited the CAB's recent transcontinental coach-type service decision as the main reason for withdraw-

TAPE SOLVES PROBLEM

Vibration caused by airline and military planes revving up engines at runway ends gave Jackson, Miss., Municipal Airport officials lighting headaches, until someone discovered that two 3-in. strips of electrical tape would solve the problem. Vibration caused connectors to threshold lights to work loose. Wrapping tape around the connection did no good, but two short strips applied on opposite sides and parallel to the cable did the trick. Assistant airport manager D. V. Tapley demonstrates the simple application which solved a puzzling problem.



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Stainless steel nozzle assemblies for jet aircraft engines. ABOVE: nozzle tip assembly. ABOVE, RIGHT: duplex nozzle assembly. TO RIGHT: dual flow nozzle assembly. All details of these units have been manufactured and assembled by Ex-Cell-O to the rigid specifications of the aircraft industry.

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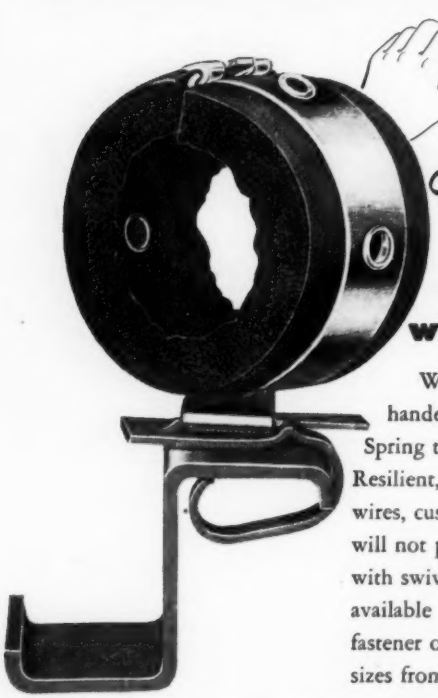

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ing his application. He wrote CAB chairman D. W. Nyrop that the Board decision "indicates to us that the Board intends to preempt the air coach field for the presently certificated airlines, at least to the extent of preventing non-subsidized airlines from competing with the presently certificated air carriers on an equal basis.

"We have also noted the Board's decision in the additional service to Puerto Rico . . . and reopened Hawaiian . . . cases, wherein applications of non-subsidized air carriers to proved coach services between Los Angeles and Honolulu and New York and San Juan were denied."

► **ONA Prejudged**—These, concluded Overseas National, prejudge the ONA application and make pursuit of a certificate a waste of time and money. "This action on the part of the Board leaves us with no alternative but to request that the application be withdrawn in its entirety," concluded the ONA letter to Nyrop.

One outstanding feature of the ONA certificate application was an offer to pay the government "for any increase in the mail pay requirements of the subsidized airlines with which we might compete."

Tompkins explained to Nyrop why he filed for a certificate in the first place: "When we filed this application we had in mind that the Board might see fit to certificate one or more non-subsidized airlines to operate a transcontinental air coach service on an experimental basis. If such had been the case, a precedent would have been established for the operation of a similar service along the eastern seaboard. We had hoped to provide such a service."

Court Grants Nonsked a Stay

For the first time in U. S. airline history, the Circuit Court of Appeals has stayed a Civil Aeronautics Board order of revocation of a carrier's operations.

The airline is Amos Heacock's Seattle-Alaska nonsked, Air Transport Associates. The court, U. S. Circuit Court of Appeals in the District of Columbia, ATA may continue flying until the court issues its decision after reviewing the case.

The court contradicts CAB counsel's opinion, and says there are substantial enough issues that might indicate in favor of the large irregular carrier. The court also holds that operation of the carrier is necessary to assure a proper decision on the issue.

Previous nonsked attempts to get a court stay of execution pending review have failed. Both Standard Airlines and Golden North Airlines tried and failed; they both went out of business.

An interesting feature of the order is that counsels of the airline and CAB must immediately work out a mutually satisfactory plan of operation during the stay. If they can't agree, the court itself will settle their differences.

IATA Committees Recommend VOR

(McGraw-Hill World News)

London—The British-developed Decca Aviation navigation system received what may be its death blow last week when two subcommittees of the International Air Transport Assn. found it had not reached a stage of development where technical and operational evaluation could be made.

IATA will propose implementation and extension of the American VOR omnirange system at a regional air navigation conference of the International Civil Aviation Organization in Paris in February.

Technical and radio aids subcommittees of IATA noted that Decca equipment had a total of only 50 hr. flying time, which was not enough to make an evaluation.

Rangoon to Get New Terminal

(McGraw-Hill World News)

Bombay—Mingaladon Airport, Rangoon, is to have a new air-conditioned Terminal building. Plans have been prepared by two English architects who were invited out to Burma by the Burmese Director of Civil Aviation. The new terminal has become necessary due to the great increase during the last year or two in the number of transit passengers. As jumping-off place for Singapore, Bangkok, Saigon, Manila and Calcutta, Rangoon is today one of the main international airports throughout all of Asia.

Capital Replaces Cross-Wind Gear

Capital Airlines is replacing its Super DC-3s' cross-wind landing gear with conventional fixed gear. Capital liked the Goodyear-developed cross-wind gear in principle, but certain problems arose —only one of them due to any shortcoming of the installation. They are:

- Pilot couldn't be sure whether the gear was locked straight ahead or still on free swivel. The cockpit light indicator didn't seem to be a sure indication whether the locking pin was home or not.
- Also, Capital did not think the cost of

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CW-2810, Aviation Week
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flight testing the gear for CAA certification was worth the price. So it never went into operational use.

In replacing a couple of wheels after failures, not in any way due to the cross-wind assembly, Capital removed the cross-wind component since it wasn't being used anyway.

Anti-Skid Braking Device Used By NWA

Northwest Airlines this month becomes "the first commercial airline" to install the Hytrol anti-skid wheel-braking device developed by Boeing for the Air Force (AVIATION WEEK Dec. 10, p. 55).

Northwest is putting Hytrol on its fleet of 10 Stratocruisers. NWA says consideration of installing it on its DC-4s, however, is only "passive" at this time.

Boeing says a Hytrol installation can pay for itself in tire and wheel wear alone, and that it can cut braking distance by about one-third on heavy aircraft.

► **2,000-Hr. Test**—Since Northwest has just pioneered commercial trials and fleet installation, most other airlines have not come around to active consideration of similar installation. Air Transport Assn. officials expressed interest in knowing more about performance of the new device.

Civil Aeronautics Administration officials say they have given little further thought to the development since certificating it on a Northwest Stratocruiser May 25. Northwest now has 2,000 hr. flight time since Feb. 3 on their Stratocruiser Hytrol test installation.

CAA says it has not sent out any comments to other airlines about Hytrol and does not plan to make it a voluntary or required improvement on any type transport. However, some observers have told AVIATION WEEK that if the device is as good as its boosters claim, it offers a means of increasing runway safety of DC-4s and DC-3s, which are not at present equipped with reversible propellers.

► **Meters Brakes**—Hytrol is an automatic brake governing system, designed to prevent skid. The device meters brake pressure to allow maximum brake effect just short of a skid. It has three main units: skid detector, solenoid hydraulic control valve, and control box.

In the CAA certification tests on the NWA Stratocruiser on frosty and slippery runway, the plane stopped within 50 to 200 ft. of the stopping distance for which the plane was originally certificated on dry runway.

Pan American says it is studying the Hytrol but has not made a decision on the matter as yet.

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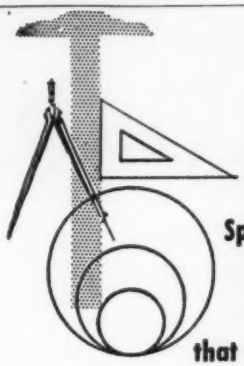

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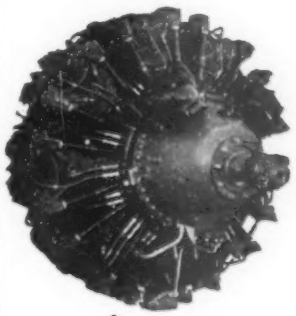

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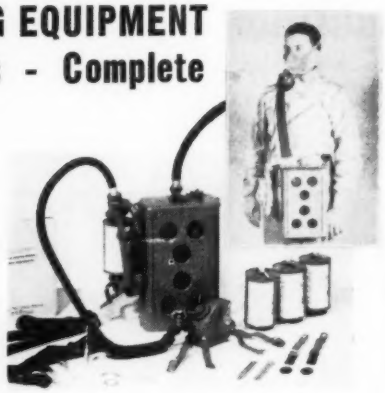

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19	1375F	Holley carburetor
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42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
185,000	LS4AD1	Spark Plug (Aero)
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56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
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160	420 DY
26	550 CD
14	550 CG
195	550 CP
104	550 EC

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45	AN4103-2	Clifford	Brass (Valve # U4785)
38	18597-2	Airesearch	Aluminum (Width 8") (Length 9")

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230	MF9-713-15A	Vickers	Hydraulic
75	AN6102-1(8818-2)	Adel	Fuel
160	2E492E	Pesco	Fuel
700	TFD 8600	Thompson	Fuel Booster
125	D7818	Adel	Anti-icer
50	2P771-A	Pesco	Fuel Booster
250	AN4014	Erie Meter	Wobble (D-3)
300	1H260-K & KA	Pesco	Hydraulic

INSTRUMENTS

19	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Same as above
16	76B19	Lewis Eng.	Cyl. Head Temp.
10	46B2	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
12	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	727TY72Z2	Weston	Left Wing Anti-icing
88	727TY73Z2	Weston	Right Wing Anti-icing
83	727TY74Z2	Weston	Tail Anti-icing
11	2227-11D-3A	Eclipse	Dual Tachometer
22	8DJ-29-AAY	G. E.	Indicator (Cowl Flap)
45	254BK-6-052	Kollsman	Differential Pressure Ga.
25	906-6-011	Kollsman	Dual Altimeter and Differential Pressure Ga.
5	14601-1G-B1	Eclipse	Attitude Gyro
22	15100-1B	Eclipse	Pitch Trim Ind.
10	20000-8A-14	Eclipse	Magnesyn Position Ind.
23	20100-11C-4-A1	Eclipse	Magnesyn Wing Flap Ind.
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780	A371206	Dumore	Motor
115	P4CA2A	Parker	Primer
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687	RS-2	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	564-2A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
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22	0655-D	Aro	Oxygen Regulator
22	M-2031	Air Associates	Actuator
148	PG208AS1	Minn. Honeywell	Air Ram Switch
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73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7°
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SHORTLINES

► **Air Express** reports eight U. S. cities do more than $100,000 air express business each monthly.

► **Air America,** an applicant for transcontinental coach certification denied by CAB, has CAB permission to resume operation as a large irregular carrier.

► **American Air Transport** has CAB show-cause order calling for revocation of its letter of registration for "willful" violation of flight frequency limits set by the Board.

► **Civil Aeronautics Board** has made a press release of its letter to the two non-sked airline associations, criticizing their members for "improper treatment" of passengers "by many large irregular carriers and their agents." The Board cites: "1. Serious delays, inconveniences and hardships," and "2. Deceptive advertising and other public representations.

► **Commerce Department** will issue next spring a cumulative index of all Civil Aeronautics and other publications put out by Commerce since its last index came out in 1944. It includes publications of recent mobilization agencies, too, such as NPA, DPA, ESA.

► **Continental Air Lines** would have its mail rate cut from January-September average of $3.29 a ton-mile to $2.97 if CAB carires out its proposal. This would be about $1,054,000 total mail pay per year, including estimated subsidy portion of $788,000. Compensatory mail rate of Continental is figured by CAB at 75 cents a ton mile.

► **El Al Israel Airlines** air freight volume of 380,000 kilograms to and from Israel first half this year is five times a year ago; this is equal to volume by all other major airlines serving Israel. El Al has been operating a DC-4 and a C-46 on all-cargo weekly service since March. Country's air freight is expected to keep growing in relative importance because other shipping facilities are inadequate. El Al has borrowed $375,000 more from Chase National Bank to cover spare parts build-up to avoid shortages. This brings total loans by Chase to company $1,175,000.

► **Mid-West Airlines'** purchase by Purdue Research Foundation is completed at stipulated price of $69,000. . . . Is considering buying de Havilland Heron to carry up to 20 passengers. Heron has four 250 hp. version Gypsy Queen engines; many parts are interchangeable with the de Havilland Dove, of which 38 have been sold in the U. S. this year. (Over 25 already operating.)

► **Military Air Transport Service's** Boeing C-97 Stratofreighter set a daily utilization record of 11.22 hr., bettering former C-97 mark of 10 hr. 19 min. Plane is operated by 1266th Air Transport Squadron, MATS Pacific division.

► **National Airlines** DC-6 landing accident of May 21 at Newark was probably caused by "faulty judgment and improper piloting . . . while executing ILS approach," the CAB judges. Nobody was hurt. Plane sagged and touched earth, 1,300 ft. before runway in approach, then bounced off and made the runway with power. Reported ceiling was 400 ft. and other planes landed without trouble, CAB says.

► **Philippine Air Lines** has ordered a fourth Convair-Liner 340. The four, together with spares, cost $2,200,000. . . . Has started the "fastest cargo service San Francisco-Taipeh (Formosa)" with DC-6 every Friday.

► **Railway and Airline Wage Board** has an analyst going over airline pilot labor contracts to check if they all conform with wage stabilization regulations. RAWB decision may appear by the end of January.

► **Southern Airways** would get $185,000 more mail pay for first three quarters of 1951 in a CAB proposal, bringing total pay that period to $1,253,385. Southern had asked an increase to maintain working capital and break even. New proposed rate is 50 cents a mile, retroactive to Oct. 1, estimated to bring $1½ million a year.

► **Trans American Airways** has filed a petition for reconsideration of the CAB denial of its application for certification as a non-subsidized experimental transcontinental coach airline.

► **Trans Canada Air Lines** is extending its flight seat reservations service to all international operations; it's been going since summer on the Atlantic run.

► **Trans World Airlines** strongly opposes the CAB's show-cause order proposing a cut of TWA trans-Atlantic mail pay from $2.22 a ton-mile to 82 cents, compared with Pan American's $2.63 rate.

► **United Air Lines** reports its DC-4 transcontinental air coach service averaged only 40% load factor eastbound and 60% westbound its first month of operation—October. This compares with its firstclass service the same period of 80% average load. Company spokesman told AVIATION WEEK "this shows air coach is not as economic as some people say it is, at least for United." But a qualified observer, however, pointed out the service has received little promotion.

WHAT'S NEW

New Books

Jane's All the World's Aircraft, 1951-1952, 42d edition, compiled and edited by Leonard Bridgman. Published by Sampson, Low, Marston & Co., London, and the McGraw-Hill Publishing Co., Inc., 330 W. 42d St., New York 18. Price $22.50.

The world's standard aviation reference on military and civil aviation shows few changes except, of course in the addition of the newer type aircraft and engines of the past year. Its excellent presentation of data and illustrations continues—this year the aircraft section contains 293 pages, 11 more than last year and there are 718 illustrations in this section, of which 440 are new cuts.

The Russian section is a few pages shorter this year, for although "new data" on Soviet aircraft is plentiful, much of it does not stand up to Jane's careful screening. As Bridgman puts it, the editor does not have "penetrative powers capable of piercing iron." There are some who are much less modest about their capabilities in this direction.

The United States continues to take first place in presentation, taking five more pages this year for a total of 100, with 256 illustrations; Britain accounts for 81 pages and 189 illustrations, and the French are covered in 34 pages with 95 illustrations, also a gain over last year.

Jane's continues to be a "must" in any serious aviation library. Those fortunate enough to contain the complete set possess a good and authoritative share of aviation history—**EJB.**

New Publications

PB 103 583—Development of a Fuel Flow Transmitter Testing Indicator. Library of Congress Photoduplication Service, Publication Board Project, Washington 25, D. C., 35 pages with diagrams, photographs and appendices, $5 in photostat form, $2.25 microfilm.

Described is a self-contained test stand which the Navy has been using to check the accuracy of its fuel flow meters. The unit can handle different viscosity fuels and is said to permit user to obtain calibration accuracy of ¼ of 1%.

1950 Supplement to Screw-Thread Standards for Federal Services, succeeding National Bureau of Standards Handbook H28 (1944), 113 pages, 17 series of tables, 17 series of figures, price 50 cents, order from the Government Printing Office, Washington 25, D. C.

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AUBURN SPARK PLUG CO., INC 4
Agency—Richards & Webb, Inc.

BRILES MANUFACTURING COMPANY 46
Agency—McKee-Burns Advertising

BROOKS & PERKINS, INCORPORATED 47
Agency—Holden-Clifford-Flint, Inc.

CHASE AIRCRAFT CO., INC 8
Agency—Charles Blum Adv. Corp.

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Agency—James Thomas Chirurg Co.

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Agency—Thomas L. Yates Adv. Agency

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Agency—MacManus, John & Adams, Inc.

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ECLIPSE-PIONEER DIV. OF BENDIX AVIATION CORP. 41
Agency—MacManus, John & Adams, Inc.

EDISON, INC., THOMAS A 31
Agency—Gotham Adv. Co., Inc.

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Agency—Holden-Clifford-Flint, Inc.

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Agency—Buchanan & Co., Inc.

FLYING TIGER LINE, INC 39
Agency—Heintz & Co., Inc.

GENERAL CONTROLS CO 22
Agency—Hixson & Jorgensen, Inc.

GENERAL ELECTRIC COMPANY ..... Fourth Cover, 34
Agency—G. M. Basford Co.

GENERAL LABORATORY ASSOCIATES 33
Agency—Charles Blum Adv. Corp.

GOODRICH CO., THE B. F 3
Agency—Batten, Barton, Durstine & Osborn, Inc.

GRUMMAN AIRCRAFT ENGINEERING CORP. ..... Front Cover
Agency—Charles W. Hoyt Co., Inc.

KAISER METAL PRODUCTS 36
Agency—B. K. Davis & Bro.

LELAND, INCORPORATED, G. H 27
Agency—Weber, Geiger & Kalat, Inc.

LEWIS ENGINEERING CO., THE 45

LINAIR AVIATION SUPPLY 26
Agency—J. B. Sebrell Adv. Agency

MONADNOCK MILLS 48
Agency—H. B. Humphrey, Alley & Richards, Inc.

NORTH AMERICAN AVIATION, INC 57
Agency—Batten, Barton, Durstine & Osborn, Inc.

PACIFIC AIRMOTIVE CORP 32
Agency—Essig Company, Ltd., The

PIASECKI HELICOPTER CORP 57
Agency—B. K. Davis & Bro.

RADIO APPARATUS CORP 40
Agency—Burton Browne Adv.

ROHR AIRCRAFT CORP 38
Agency—Barnes Chase Co.

SAFE FLIGHT INSTRUMENT CORP 24
Agency—Davis-Parsons, Inc.

SEARCHLIGHT SECTION 49, 50, 51, 52, 53, 54, 55

SIMMONDS AEROCESSORIES, INC 47
Agency—Jones & Brakeley, Inc.

STANDARD PRODUCTS, INC 48
Agency—The McCormick-Armstrong Co.

STEEL PRODUCTS ENGINEERING CO., THE 28
Agency—Geyer, Newell & Ganger, Inc.

SUNDSTRAND MACHINE TOOL CO ..... Second Cover
Agency—Howard H. Monk & Assoc.

SWITLIK PARACHUTE CO., INC 42
Agency—Charles Blum Adv. Corp.

TEXAS ENGINEERING & MFG. CO 8
Agency—J. B. Taylor, Inc.

THOMPSON PRODUCTS, INC 30
Agency—Meldrum & Fewsmith, Inc.

WESTINGHOUSE ELECTRIC CORP 25
Agency—Fuller & Smith & Ross, Inc.

WYMAN GORDON CO 6
Agency—John W. Odlin Co., Inc.

ZIEGLER STEEL SERVICE CO 49

SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant 50, 52
Positions Wanted 50

NOTICES
Auction 53

PROPERTY
For Sale 53

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 53, 55

WANTED
Equipment 53

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● Scheduled 45 hr, 5 day week; premium pay for overtime, group hospitalization, group insurance, paid vacations & holidays. Clean, modern, well-lighted buildings in park-like surroundings only half-hour by car or train from center of Philadelphia. Railroad depot at plant entrance. Work and learn with a leader, with the BEST engineers in the industry.

● **WE NEED**

TOOL DESIGNERS

— also —

ENGINEERING DRAFTSMEN

. . with aircraft experience on Airframes, Controls, Electrical Installation & Power Plant Installation.

● **AND**

ENGINEERS

. . for Flight Test, Instrumentation, Structural Test, Materials and Process.

● **WRITE**

. . giving detailed resume of experience and education to—

Engineering Personnel Manager

Piasecki Helicopter Corp.
Morton, Pa., Near Philadelphia

EDITORIAL

Lots Safer on Trains?

In reference to your editorial, "Let's Keep This Straight," on Dec. 3: Aviation has no monopoly on safety advertising, either. Of late you seem to have become hypersensitive about railroad advertising.

On many highways I see billboards advertising a leading railroad, saying "Tired? Next time travel in comfort and safety—travel by train." These signs are obviously directed at motorists and bus passengers. Is this railroad to be taken to task because travel by air might be even more comfortable and safe?

As one who must use on occasion most common forms of public transport, I am pleased to see competition for my patronage on a basis of safety. I know that any carrier featuring safety in its advertising will in truth be a safe form of travel since any accident would damage their whole costly advertising program. Thus safety advertising actually does tend to beget safety.

It ill becomes you, who have been a leader in demanding safety in aviation, to belittle the safety advertising of others.

NAME WITHHELD
Schenectady, N. Y.

The letter above is the only one we have received, to date, disapproving of what has become a rather widely discussed subject. We have written him this letter:

Dear Mr.—: We are glad to have your view. You are entitled to it. It does not represent the view of the average man in aviation, we believe. Just one of the purposes of a specialized publication, such as Aviation Week, is to reflect—as well as to try to direct—opinion in its specialized field. But Aviation Week feels it should not stop with such reflecting or directing; it should back it up with the best reasoning or facts it can put together.

We have not objected to railroad advertising generally. We began objecting to one advertising campaign shortly after it started. It was not "of late." The campaign is Pullman's; it's still running.

We have no objections to the rails directing advertising to highway travelers; certainly the type of message you mention is more conservative than the most objectionable Pullman copy.

We don't see how any fair-minded person in aviation could blame the railroads or Pullman for trying to capitalize on service features they really believe are better. But they are matters of opinion—not matters of life or death.

When advertising gets into human life, health and death, and uses these in sales efforts against competitors, you really plunge into business ethics with both feet. Every reputable advertising association and publication in the United States has included some reference to this problem in its code of ethics or statement of policy. Advertising of any type is refused by the best publications if it charges that human health will be endangered or that death is threatened by the use of a competitor's product. And even if ads were deemed truthful, the ads of the dangerous product would not be allowed to be printed.

Aviation people and Aviation Week editorially believe some of the Pullman advertising goes over the line of ethics and good taste. Even if others won't go that far with us, we still feel they should realize that it goes so close to that line that it is bad business and questionable ethics to permit Pullman to capitalize on such copy.

It's true that aviation or airlines are not mentioned in the Pullman copy. The wily ad writer can reply that his message is addressed to all non-Pullman travelers.

OK, so the ad writer says he's just trying to get business from automobiles, buses, and airplanes. But when the planes are down between Boston and New York or New York and Washington, for example, where does the rails' extra storm business really come from? Where were these old customers? Every airline man knows they come from the airlines. The rail men know it too.

We all know from statistics that the airlines are the railroads' biggest current passenger business threat. The rails long ago gave up hope of capturing or recapturing much more business from the private motor car. That's all gone forever, at least any important percentage. The total business Pullman cars get from buses probably wouldn't be worth mentioning.

But airline business is still important to Pullman. It's still worth Pullman's fighting to keep the quality business it has left, or to recapture what it can from the air carriers. This the railroad people know. So do the airlines. So the ad writer can feel pretty happy with himself because he doesn't mention airlines, but everybody in the railroad and airline businesses knows where the real field of battle lies and let's not kid ourselves that they do not.

And because there are more past or potential railroad travelers who might be lured away to the airlines than to any other non-rail transportation, the airlines have the most to lose from the current Pullman ads that say, "Don't you feel a whole lot safer on the train?"

What's unethical about this series? Our answer briefly is that by innuendo and insinuation these ads give the impression that all other transportation is a threat to life and health, an invitation to death. The "whole lot safer" phrase is a neat and quick insinuation without any accompanying substantiation.

We agree when you say, "I am pleased to see competition for my patronage on a basis of safety." We agree with you if the advertising is based on a past good record, on honesty and truth. But do you want to be lied to, or lured to a carrier by misrepresentation before you get on it?

I can't agree with your next sentence: "I know that any carrier featuring safety in its advertising will in truth be a safe form of travel since any accident would damage their whole costly advertising program."

How in the world can you know such a thing? Advertising on a past good record is one thing. Advertising to the effect that future safety is an automatic result of safety advertising is monstrous. Accidents not only can "damage a whole costly advertising program." They can wipe out an entire business or industry.

Every transportation industry ever known—or any other human activity, for that matter—has always suffered from "acts of God"—a few accidents that could not have been prevented. That goes for the railroads, too, although we know they try to achieve safety just as the airlines do. But they aren't always successful, either, are they?

As to your last paragraph, we urge safety advertising for anyone who can back it up with past facts. But let's not advertise insinuations and innuendo or distort the facts so the public is misled into thinking the comparisons are worse for air than they are.

But do you think the public would ever gather from the current Pullman ads that on the certificated airlines fatalities so far this year are only 1.5 persons for every 100 million passenger miles? Or that up to mid-December the passenger fatality rate was a perfect zero (yes, zero) per 100 million passenger miles on common carrier flights of the country's nonscheduled air carriers? Were the rails a "whole lot safer" than the nonskeds in this year up to mid-December? They certainly were not.

—Robert H. Wood

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This is only one of the many top priority military cargoes flown by the rugged, battle-tested C-119 "Flying Boxcars," the mainspring of our mobile Armed Forces, airlifting everything from medical supplies and tanks, to pontoons and paratroopers. Whatever is needed, wherever it's needed, Fairchild's "Flying Boxcars" *can* and *are* delivering the goods!

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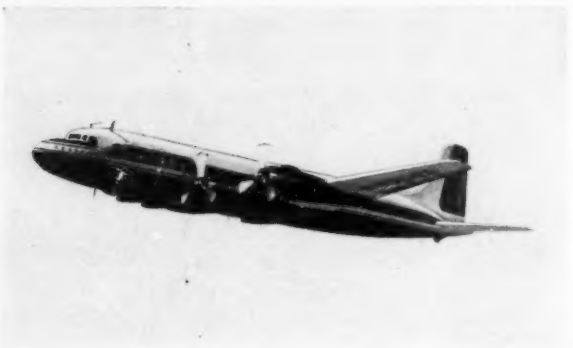
THE NEWEST AND BIGGEST AIRLINERS ARE BEING EQUIPPED WITH G-E ELECTRICAL SYSTEMS

Lockheed's new model Constellations, and all Super-Connies use General Electric protective systems. G-E provides the fastest possible tripping of overvoltage faults—and freedom from nuisance tripping.

G-E provides the only positive method of isolating a faulty generator without affecting service. That's one reason why all of Pan American's Boeing "Strato" Clippers use G-E systems.



New Douglas DC-6B's being built for Pan American World Airways will be equipped with G-E electrical systems. G-E provides the most complete electrical protective systems ever placed in production for commercial transport-type aircraft.

The country's first turboprop transport—the Convair-Allison Turboliner—is equipped with a G-E electrical system. G-E systems are tailor-engineered to give the protection you need for ordinary or special applications.

The list of planes using G-E protective systems is a roll call of today's most popular aircraft. Are your planes listed among them?

One serious fault that damages electrical equipment in just one of your aircraft could cost you more than G-E protective systems for your entire fleet. Can you afford *not* to investigate?

For more complete information get the new fact-crammed bulletin GEA-5628. Telephone your General Electric aviation specialist or write General Electric Company, Section 210-16, Schenectady 5, New York.

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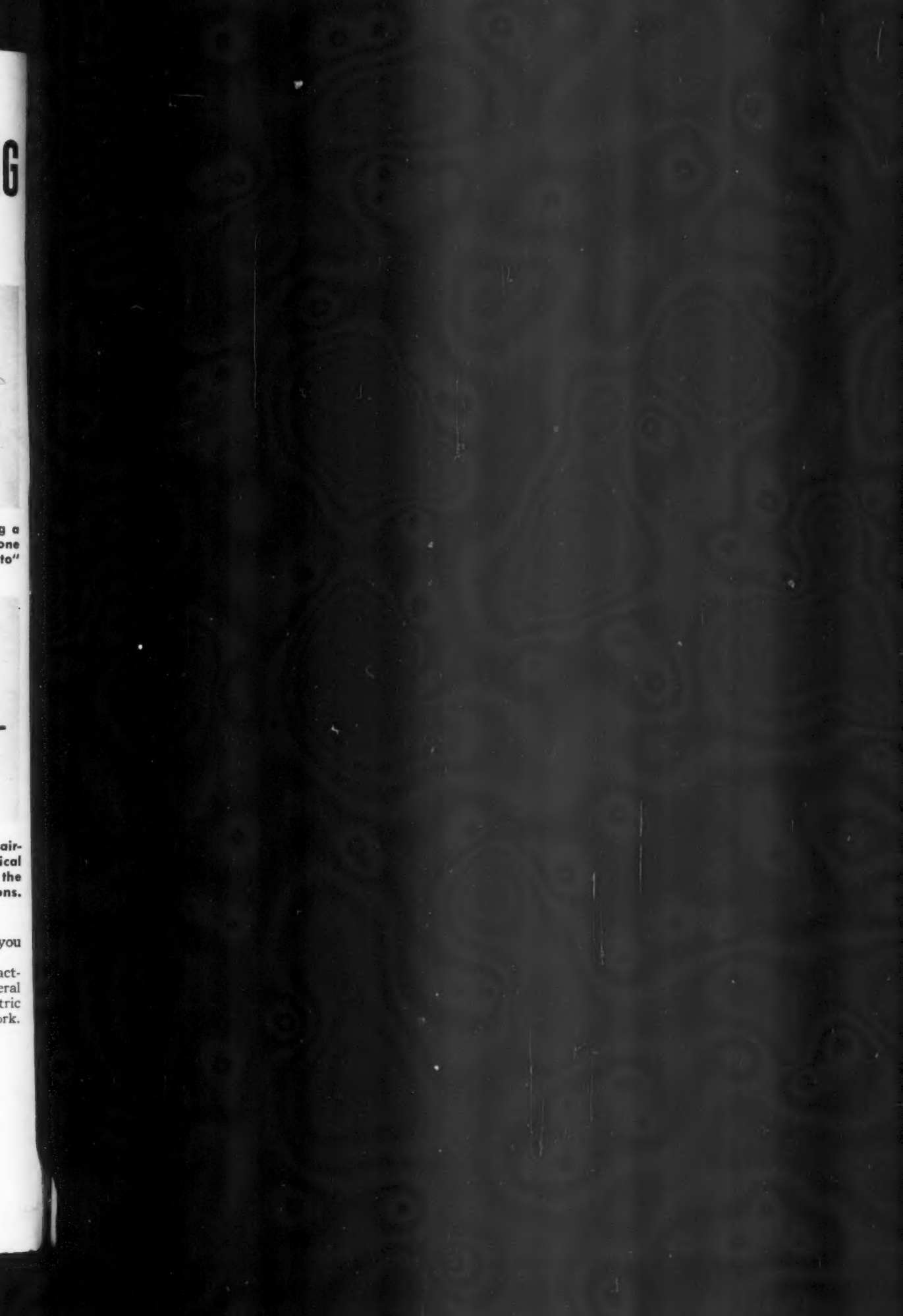
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